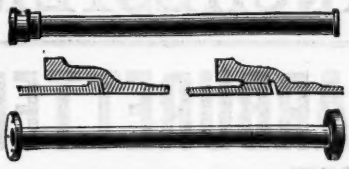
THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXVIII. No. 1730.] LONDON, JULY 7, 1896. [48TH YEAR. PRICE 6d.

GAS AND WATER PIPES

1¼ to 12 IN. BORE.



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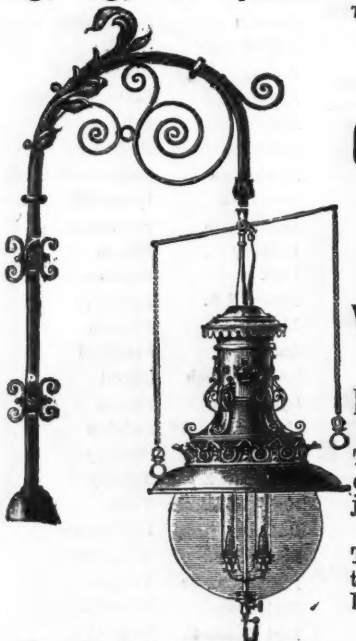

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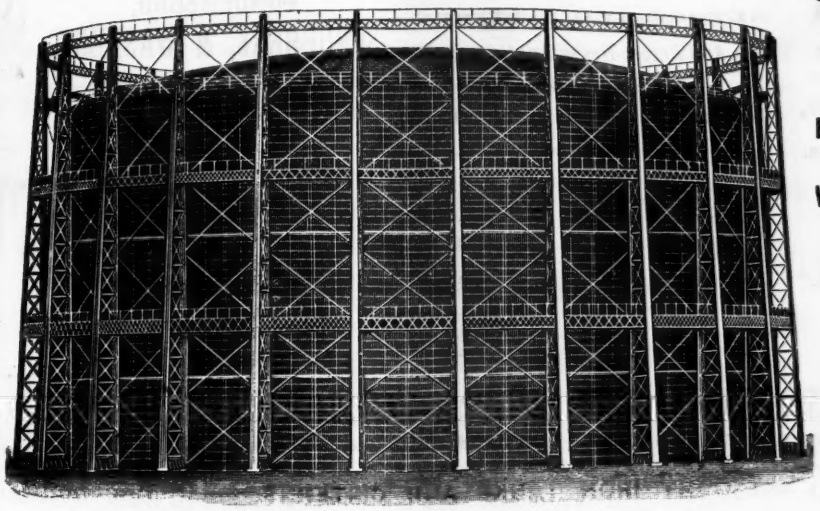

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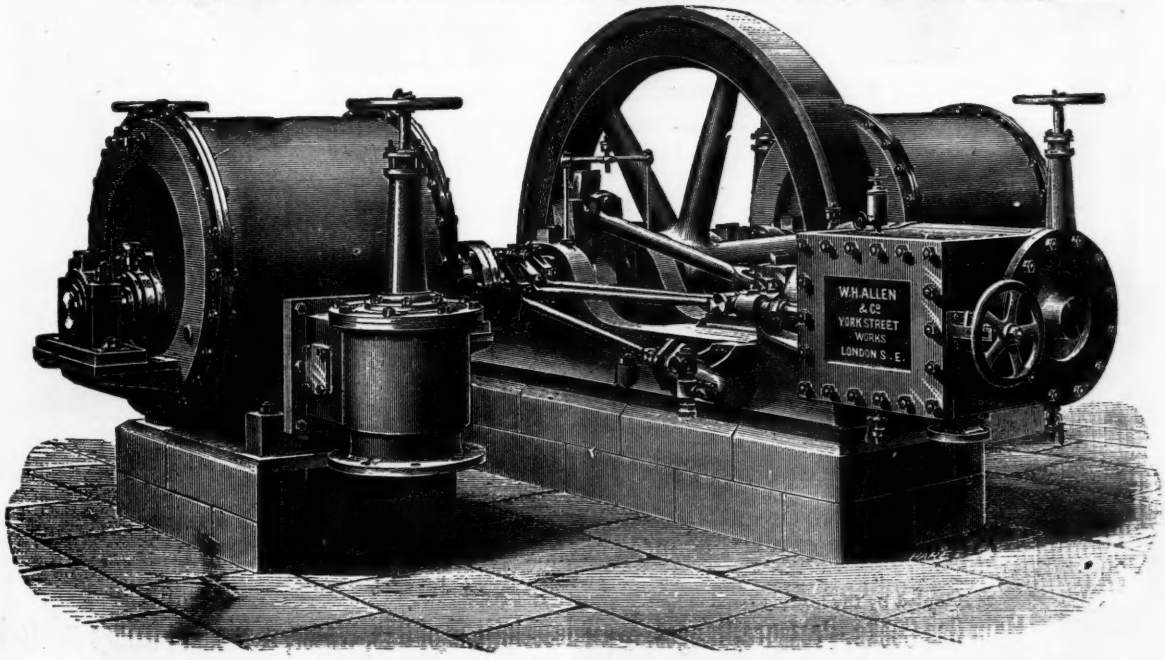

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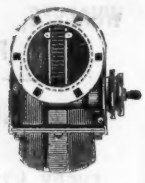

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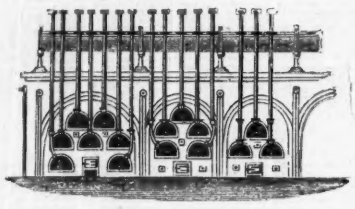

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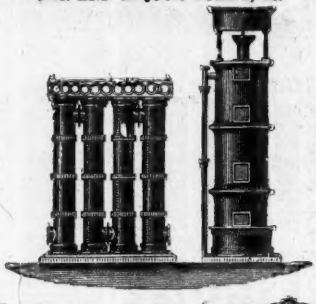

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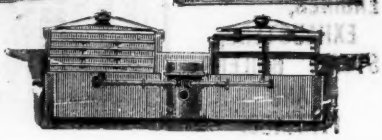

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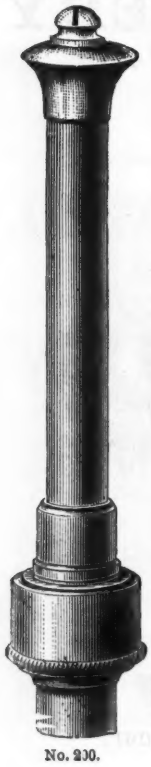

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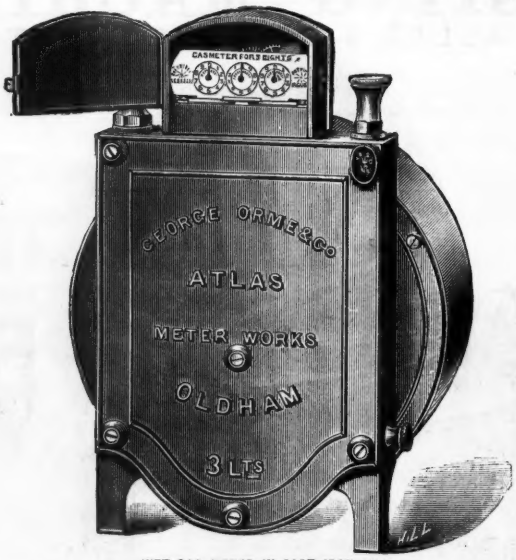

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DATE.	NAME.	No. of Lifts.	Lifts with Ropes.	Diam. in Ft.	Height in Ft. when full.
1894	Middlesbrough Corpn.	3 & Tank	All	184	120
1894	Sligo Gas Company	3	All	50	54
1894	Cie L'Union des Gaz Milan	2	All	116	46
1892	Bathurst (N.S.W.)	2	All	82	36
1895	Athens (Greece)	2	All	64½	42
1890	Tyne Dock Gas-Wks., N.E.Ry.	2	All	71	42
1890	Newburn-on-Tyne	2 & Tank	All	47½	52½
1894	St. Austell Gas Company	2	All	34	34
1894	Birkenhead Corpn.	4	2 Top	160	120
1894	Cape Town (S. Africa)	3	Do.	50	48
1892	Nottingham Corpn.	4	1 Top	100	100
1892	Nottingham Corpn.	4	1 Top	90½	100
1893	Do.	4	Do.	90½	100
1893	Do.	4	Do.	90½	100
1890	Manchester Cor. (Gaythorn Wks.)	3	Do.	130	90
1890	Do. Do.	3	Do.	100	75
1890	Do. Do.	3	Do.	100	75
1889	Do. (Rochdale Road)	3	Do.	100	75
1891	Darlington Corpn.	3	Do.	100	73½
1895	Barrow-in-Furness	2	Do.	100	41
1889	Haslingden Union Gas Company	2	Do.	80	44
1894	Selby Local Board	2	Do.	50	36
1896	Stone Gaslight Company	3	All	42	48

Numerous Single-Lift Holders.

THE FOLLOWING ARE IN COURSE OF CONSTRUCTION:—

NAME.	No. of Lifts.	Lifts with Ropes.	Diam. in Ft.	Height in Ft. when full.
Falkirk Corpn.	2 with Cup & Tank	Both	130	40
Perth Corpn.	2 Do.	Do.	125	50
Barcelona (Spain)	2	Do.	98½	52
Perth (W. Australia)	2 & Tank	Do.	75	40
Derby Gaslight Co.	4	Top	125	102
Birmingham Corpn.	1		80	20
Malvern	2	Both	120	48
Preston Mills	2	Both	48	36
Brest (France)	1		43	13

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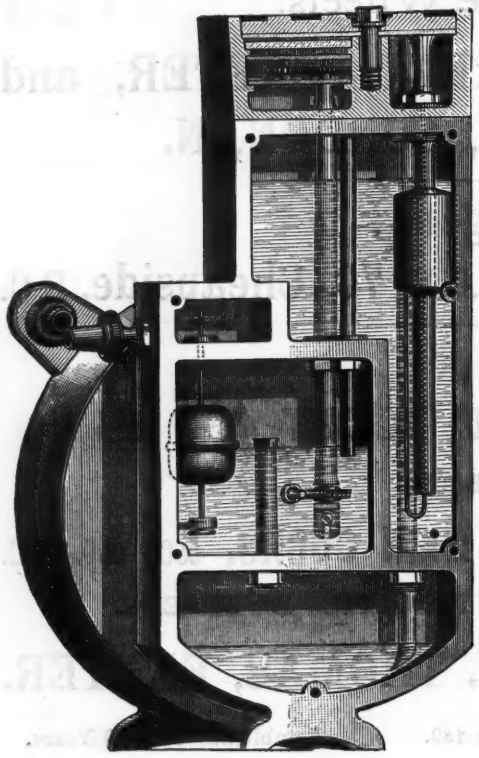

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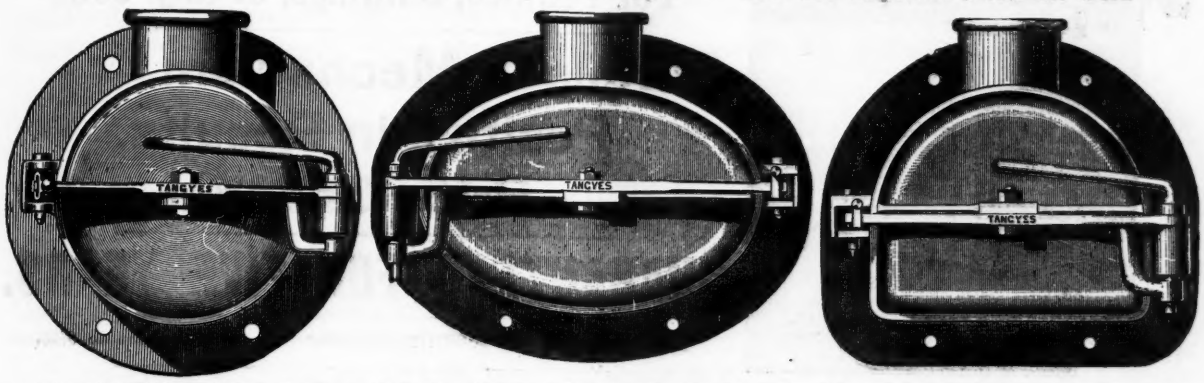
With Holman's Anti-Friction Catch, Self-Sustaining Cross-Bar, and Improved Eccentric Bolt.



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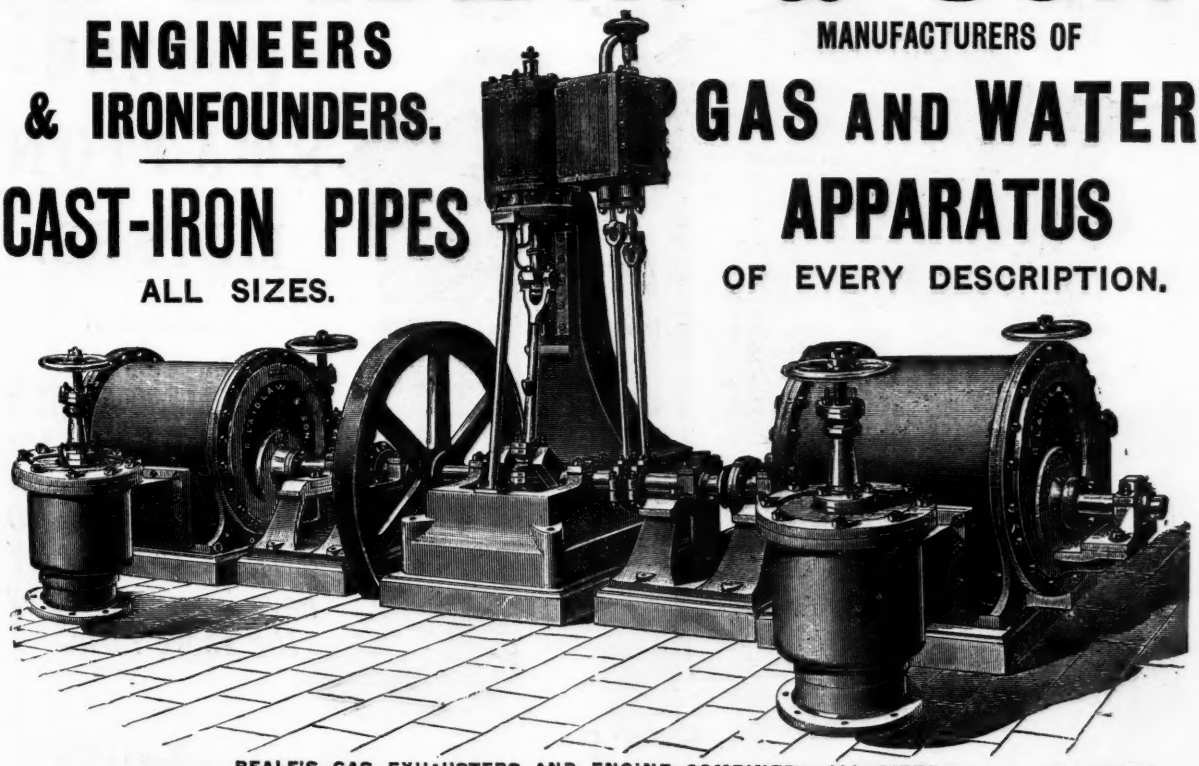

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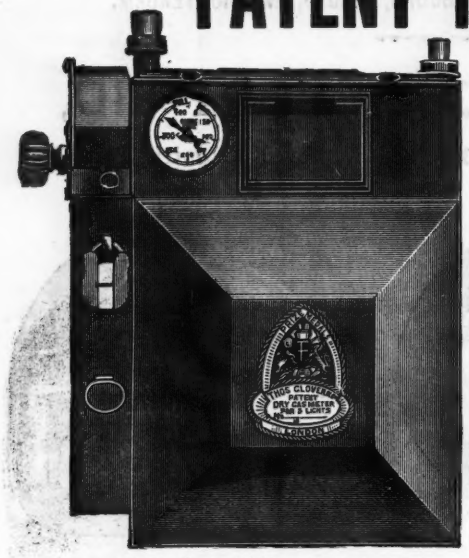

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EDITORIAL NOTES.

The Gas Question in Liverpool.

THE special report of the Lighting Committee of the Liverpool City Council, the substance of which was published in the "JOURNAL" for the 9th ult., was discussed at a meeting of the Corporation last Wednesday. Unhappily, the Liverpool gas supply has become a question of party politics in the city; and accordingly Alderman Sir Arthur Forwood, the Chairman of the Committee, in moving the adoption of the report, considered it befitting to embroider his explanation with a number of political allusions and reflections which might have increased the local interest in the matter, but cannot be taken notice of here. There is quite enough solid substance in the report, however, to engage the attention of those who are interested in the gas supply of Liverpool upon financial and technical grounds, altogether apart from its bearing upon municipal politics. The present phase of the Liverpool gas question was opened by the insensate proceedings of the late City Council, culminating in the passing of a resolution in favour of the establishment of competing works. Soon after the achievement of this monumental piece of ineptitude, the City Council of that day met the doom of the polls; and a new Council came into being which adopted a policy with regard to the Gas Company that started with the rational idea of ascertaining and considering the facts of the case. The first fact to be faced was the statutory guarantee of the Company's *status*, which the headstrong old Council had attempted in vain to ignore. This being recognized, the next point for consideration was how the Company could be dealt with, assuming it to be expedient that they should be suppressed in the public interest, which a certain section of the Council took for granted. It immediately appeared that the only possible way of attaining this end was by buying up the Company's property; and a little investigation made it clear that this would be a "large order," even for Liverpool. Of course, it could be done—at a figure; but it was soon evident that it would not be worth doing. After all the vague talk that had been current in Liverpool about the enormous dividends and exorbitant profits of the Gas Company—talk which, after all, could only have deceived those impecunious would-be reformers of local affairs who had never had occasion to buy gas stock by auction—it was easy to perceive that, by the time the probable price of the gas undertaking was paid, and the charge for redemption provided for, there would not be much left of the gas profits to subsidize the rates, or give to the consumers in the shape of a reduction in the price of gas. And what little surplus might appear, moreover, was dependent on the realization of the hazardous hypothesis that municipal management would not only prove as efficient as the existing administration, but be capable of introducing many improvements and economies in the manufacture not to be otherwise obtained. When these considerations were made to appear out of the muddle in which the advisers of the old Council had plunged the gas question—which was the first care of Sir A. Forwood's Committee—it is not surprising that the ill-instructed clamour for the acquisition of the gas undertaking by the Corporation died away.

Upon the clear understanding that the Corporation would have to live with the Gas Company for the future, it was obviously wisdom that arrangements should be made for rendering this companionship as comfortable and beneficent as possible. The Committee formulated certain conclusions which they recommended as indicating the nature of a new settlement of the gas question that would subserve the public interest, and might not really be unacceptable to the Gas Company. In arriving at these conclusions, the Committee procured evidence respecting the condition and system of administration of the gas undertaking which incidentally demolished the fables that had been circulated by the enemies of the Company. It has been the conspicuous merit of the Committee presided over by Sir Arthur Forwood that they have preserved a really open mind for the reception of actualities; and because the Chairman has not been afraid of accepting facts which show to the advantage of the Company, he has been called their apologist by those whose prejudice blinds them to every piece of evidence of this nature, though it were as clear as daylight. On the other hand, the Committee find that the existing system of the Company might be improved both

as to administration and in regard to gas manufacture. There is nothing in their recommendations on this head to threaten the integrity of the undertaking; and we think the Directors and proprietors would be well advised if they should so far meet the Corporation as to accept the principle of nominee Directors—following in this the precedent of Sheffield. Any question of works improvement must, of course, stand over to be dealt with by the responsible Board, however constituted. There is nothing pressing in these minor points of the Committee's report.

It is gratifying to note that the report was adopted by the City Council by a majority of more than two to one. It could hardly have been otherwise, after the Chairman's strong and lucid speech, and the flabby rejoinder of Alderman F. Smith, the propounder of the exploded competitive supply scheme. Neither Alderman Smith nor his supporters could meet one of Sir A. Forwood's points. They did not attempt to do so, but contented themselves with feeble maunderings about nothing in particular. They thought it would be better for everybody if the Corporation had possession of the gas-works; they blamed Sir A. Forwood for blessing the Company when they wished to do the other thing; and so forth. This may be Progressivism, but it is not business; and no such small complainings are likely now to stand in the way of the Corporation, who have a better chance than has occurred for a generation of coming to permanently satisfactory terms with the Gas Company, and so solving the local gas question once for all.

A Question for Gas-Testing Authorities.

It is not surprising that Mr. George Livesey should have been moved to comment somewhat stringently on Mr. Dibdin's remarks at The Gas Institute meeting upon the testing of London gas. Apart altogether from the specific points of history and practice raised by Mr. Livesey—and there is no more competent authority in either department of photometrical knowledge—we desire to return to the subject of Mr. Dibdin's observations for the purpose of bringing out something that has not received the attention it merits. We wish to ask the question: What is the object of all this gas testing, and what purpose is the gas-testing staff of the London County Council intended to fulfil? Is it to make sure that London gets gas of the quality prescribed by the law, and, in the phraseology of the Adulteration Act, "demanded by "the purchaser," or is it to catch the Companies tripping, and extract fines from them? The behaviour of the officials engaged in the work of gas testing is naturally likely to be affected, especially in the case of the weaker members of the staff, by the knowledge of what is expected of them at head-quarters. Most of the London Gas Examiners—we should like to believe it of all of them—are as independent and honourable gentlemen as they are able and experienced observers. But if a considerable number of men in official positions are exposed to the temptation of "justifying their existence"—if they are led to believe that they are expected to take a side—the result is obvious. This is a matter for members of the London County Council to see to; for as they pipe, so will their officers be tempted to dance. It is notoriously so with regard to the Water Companies. Everybody concerned knows, also, how the gas question of Dublin is kept alive. The London County Council are very quiet with regard to the gas supply; but it would be interesting to learn what, in the opinion of those members who have to do with the business, is the true object of the work of the testing-stations. It has often been observed how prone officialism is to mistake means for ends. The average Building Act surveyor, for instance, thinks the reason for the existence of the law he helps to administer is to enable him to charge fees; and the ordinary inspector of nuisances would be desolated if there were no nuisances for him to inspect. It looks very much as though this kind of influence had penetrated so far as some gas-testing authorities or officials; but one would like to be reassured on the point.

The Report and Accounts of the Manchester Corporation Gas Committee.

The annual report of the Manchester Corporation Gas Committee was given in last week's "Journal;" and to-day we publish an abstract of the accounts accompanying it. The Committee report an increase of 2·16 per cent. in the consumption, which is very satisfactory, having regard to the character of the weather in the past winter. The adoption of prepayment meters has resulted in a large addition to the number of consumers; and the rate of increase in the demand for gas for fuel and power generation is satisfactorily maintained. The estimated loss of revenue from the reduction in the price of gas by 3d. per 1000 cubic feet, and from the abolition of meter-rents within the city, was £56,100; but, owing to the increased consumption, the actual loss from both these sources was only £46,511. The returns from coke and ammoniacal liquor show a falling off; but this was more than compensated for by a saving of over 13¼d. per ton on the coal and cannel carbonized. Hence the reduction in price must be regarded as completely justified, and the misgivings of the Committee on the subject unfounded. The report tells an encouraging tale of material and technical progress; and it would certainly appear from the accounts that the undertaking is better managed now than used to be the case. The Committee seem to have attained to a business-like method of supplying themselves with coal and other necessaries; and they are taking steps to equip their works with modern appliances for manufacturing and purifying gas. The accounts, as usual, are very full, and are worked out in great detail. From one of the appendices (which we do not reproduce), it appears that the process of redeeming the capital cost of the undertaking has so far progressed that there is now an excess of assets over liabilities of £943,436. It is still a question for the consideration of the Manchester public whether it might not be better for the City to make a further reduction in the price of gas, instead of continuing to subsidize the rates.

The Voting of Members of Parliament.

The Select Committee on the question of the voting of Members of Parliament having personal interest in the matters dealt with by the House in its legislative capacity, have agreed upon a report, which is to be presented in due course. It was drafted by the Chairman (the Chancellor of the Exchequer); and it accepts the views expressed by the late and present Speakers. It being clear, from the evidence taken, that the decisions as to the nature and extent of the personal pecuniary interest in any question which should disable a member from voting upon such question, have not been uniform, the principal point for the Committee to determine was whether a more precise definition of this interest is desirable. Such a definition could only be arrived at and maintained by the enactment of a Standing Order; and this the Committee are unable to recommend. They believe the present system to be at once a better safeguard against an improper use of the vote, and a greater security for the rights of the representatives of the people. It is considered that no Standing Order could be framed so as to include all the possible varieties, present or prospective, of personal pecuniary interest, while it would necessarily be both strictly and narrowly interpreted by the Speaker or the Chairman. The enactment of a Standing Order might, therefore, the Committee think, actually facilitate such arrangements by members who might desire to make improper use of their votes as would enable them to do so with impunity; while the very uncertainty and width of the present definition, which admits of infinite degrees of variation, according to the judgment of the House on the merits of every individual case, would act as a deterrent to all attempts of the kind. The Committee consequently hold that the matter may be allowed to rest as it is, with the understanding that any question of the disallowance of a vote should only be permitted to be raised immediately after the vote was given, and should be forthwith decided by the House itself. A memorandum setting forth the rules usually adopted in regard to the voting of directors of companies upon contracts or matters in which they are interested, was brought under the notice of the Committee; but it was not accepted as evidence pertinent to the inquiry. The only division of the Committee was one taken upon an amendment to the Chairman's report, moved by Mr. Haldane, recommending that the rule disqualifying members who are directors or shareholders in companies from voting on Private Bills affecting their companies should be more stringently applied. This was negatived, although only by six votes to five. It may perhaps be heard of again. But the main result of the Committee's deliberations will probably command the support of the House. In such a matter, it is impossible to generalize satisfactorily;

and the only equitable course is to solve every individual question as it arises. As "The Times" very sensibly puts it, "there may be cases in which a man's interest in a "company or undertaking is so overwhelmingly great, in "comparison with his general resources, that, whether as "director or as shareholder, his vote may be open to "suspicion. But the House may be trusted, under existing "arrangements, to detect any such irresistible bias; while "in any case the public interest is safeguarded by the fact "that, however such men may vote, they are powerless to "carry any proposal that does not command the assent of a "very large number of men unaffected by their peculiar "preoccupations." Yet there are such things as close divisions, even in the most numerous bodies; and it is in such circumstances that disputes over individual votes may be expected to prove most acrid.

The Conciliation (Trade Disputes) Bill.

THE Government Bill providing for the settlement of trade disputes by "conciliation" was read a second time in the House of Commons last Wednesday, and was afterwards referred to the Standing Committee on Trade. Only five votes were recorded against the second reading, so that the sense of the House may be regarded as practically unanimous in favour of the principle of the Bill. As we have already had occasion to observe in regard to the Bill, it does not go far; but it is a matter of opinion whether this feature is a merit or a blemish. It is useless to legislate in advance of public opinion; and it cannot be made out very clearly that public sentiment has yet progressed beyond the confession that something ought to be done to put a stop to the scandal of factitious strikes. The Government Bill does little more than give *locus standi* to boards actually or to be hereafter constituted for the conciliation of trade disputants, or for the composure of industrial hostilities upon bases of fact and reason. It has been objected to the Bill that almost everything it gives the Board of Trade power to do can be done without legislation. But to this there is the sufficient answer that the measure would make it the business of the Board to do what cannot now be done except as a confessed interference with the business of other people. It was significant that the professional Trade Unionists in the House who took the trouble to attend and take part in the second reading debate—there were not many of them—professed dislike of the Bill, and declared it to be unnecessary. It is easy to depreciate the value of such a piece of legislation on the score that there are no means of enforcing its awards; but there is another way of looking at the matter. It is the deliberate judgment of the wisest observers of trade disputes, that ignorance of the facts of the case, both on the part of some of the disputants and of the public, is a leading feature of the most prolonged and embittered of these troubles of the industrial system. Apart altogether from the question of how an impartial opinion is to be carried into effect, and antecedent to it, is that of how such judgment is to be formed. In almost every strike, the position of the employers has been little understood, while the case of the men has been misrepresented by those interested in carrying it to a successful issue. The latter have been too prudent to reject "con-"ciliation" in so many words; but they have never disguised their idea that conciliation for them means giving them all they ask, and perhaps a trifle more. If a new law on this matter emerges from the present session of Parliament, one leading feature of it will be an authorization for the Board of Trade to have the facts of any industrial dispute inquired into and made known. This will not suit the professional strike-mongers; but it will do more than anything else that has been suggested with a view to quelling artificial outbreaks.

Welsbach Burners for Lighthouses.—In the course of the article on "Coast and Lighthouse Illumination in France," by Dr. C. S. Du Riche Preller, in "Engineering," to which reference was made in a "Note" last week, he deals with the subject of lighthouse illumination by Welsbach burners. He states that the Auer incandescent gas-light was first experimentally applied on the French coasts in the Isle of Chassiron lighthouse, in the Bay of Biscay, in an ordinary first order optical apparatus, giving flashes one second in duration, at intervals of nine seconds. The results have been so satisfactory that the same system is in course of being extended to all the first order lights which hitherto have been produced with mineral oil.

WATER AND SANITARY AFFAIRS.

LAST week the Hybrid Committee of the House of Commons on London Water Bills sat consecutively for four days—devoting the first two to the Bill of the New River Company, and the last two to the Staines Reservoirs Bill. Sundry amendments having been made in the latter measure, it was passed, and ordered to be reported to the House. This was on Thursday. On the previous Tuesday the Chairman announced that the Committee had passed the preamble of the New River Company's Bill, subject to certain alteration of clauses. The change thus effected in the Bill was considerable, mainly owing to the share of the New River Company in the Staines Reservoirs Bill. All power in regard to new wells was struck out, together with the proposed Enfield Chase reservoir and several consequential works. Mr. Francis, the Engineer to the Company, had previously stated that they were willing to forego works to an extent which would reduce the aggregate outlay under the Bill to less than a million, as compared with a million-and-a-half originally proposed. They were willing to consent to this reduction in the expenditure, owing to the passing of the Staines Reservoirs Bill, by which the New River Company would be assisted. The absence of the Enfield Chase reservoir seems to be rather a serious matter. It constituted the heaviest item in the programme; the estimate being £305,000. This part of the scheme appears to have been sacrificed owing to the force which the Committee attributed to their instructions, requiring them only to recognize immediate wants. Mr. J. Stuart, one of the members of the Committee, remarked that the reservoir might be very desirable in itself; but the instructions to the Committee struck them off from it. Mr. Francis pressed for the retention of the reservoir, but in vain.

In the settlement of the clauses of the Staines Reservoirs Bill, there was a prolonged discussion concerning the payment to be made to the Thames Conservators, and the manner of its appropriation. The promoters of the Bill were willing to pay £5000 down for new works, as proposed, and an annual contribution of £3000; but a clause was brought up by the Counsel for the Conservators, requiring an annual payment of £6300. On the part of the promoters, it was urged that whatever sum was paid to the Conservators should be expended on the improvement of the Thames above the points of intake, and not on works for improving the navigation of the river or the drainage of land. As the payment made to the Conservators is clearly a "tax on the water consumer," it is only right that the money should be expended for the benefit of the latter. This was the view taken by Mr. Freeman on behalf of the London County Council. Mr. Rigg, as representing the Corporation of the City, differed from the County Council, and argued that the money might be well spent in the navigation of the river, "as this was affected by the "abstraction of water in the upper reaches." It was finally agreed that the Conservators should be compelled to spend the money "on works rendered necessary by the "Bill." Among these works is a weir at Penton Hook. The Committee decided that the amount to be paid should be £5000 per annum. We hope the Conservators will conscientiously apply this contribution to such works and to such operations as will promote the purity of the river. It may be pleaded, in future, that the navigation is injuriously affected by the new water-works, as was suggested by the Corporation; but in that respect the Staines project is likely to confer a benefit instead of inflicting damage. As bearing on the main question, we may observe that the Government Bill for establishing a Metropolitan Water Board seems only too likely to become a dropped measure. On the other hand, the London Sea Water Supply Bill is apparently secure. At the London County Council, the report of the Water Committee proposing Bills for the Welsh scheme and for the purchase of the undertakings of the Metropolitan Water Companies was again postponed last Tuesday, and is on the *agenda* for to-day.

A document of importance, relative to the question of the Metropolitan Water Supply, is in circulation among members of the County Council. It consists, in the first place, of a report of considerable length by Mr. Dibdin, the Council's Chemist, giving the results of the analytical investigations of the London Water Supply conducted by him at the request of the Council, and extending over a period of twelve months ending last

December. Mr. Dibdin's report is dated Jan. 30, 1896, and has therefore been some time on the road to publicity. Even now, it appears without the diagrams that belong to it; these being still in the hands of the printer. Though diagrams are wanting, there are several attached reports, including three originally prepared by Dr. Dupré, Dr. Klein, and Dr. Stevenson, with a view to their giving evidence on the Water Transfer Bills of last session. Other accompanying reports have reference to the effect of soft water on leaden pipes; and last, but not least, there is a setting forth of "remarks" by Mr. A. R. Binnie, the Council's Chief Engineer, bearing date as recently as May 13, in which the report of the Council's Chemist is subjected to criticism. Mr. Dibdin points out that there was a marked improvement in the quality of the water supplied in 1895, compared with 1894; but Mr. Binnie fails to agree with him that this result is due to the improved filtration employed by the Companies, and attributes it rather to a difference in the rainfall and the flow of the river. The reports by the three chemical experts speak of certain defects in the process of filtration at the periods to which their investigations refer. It seems to be admitted that the Companies' filters act well and satisfactorily at times, but they fail occasionally. Mr. Dibdin, while referring to failures in the past, goes on to speak of the "higher degree of purity" subsequently given to the supply, and apparently maintained. But the whole question is changed when we are called upon to consider the effect which is produced when samples of the present filtered water are treated by Clark's softening process. A further purification is then effected, which not only reduces the degree of hardness, but accomplishes an enhanced diminution in the amount of dissolved organic impurity, and in the number of bacteria. With these results, there is the removal of "the whole of the "matters in suspension." The important conclusion arrived at is thus expressed by Mr. Dibdin: "It would "therefore seem that, by the adoption of the system of "softening, the present supply in respect to its chemical "quality and number of bacteria would be improved to a "degree comparable with that of the Welsh sources." The cost of the lime is estimated at £35,000 per annum. Mr. Binnie puts the figure considerably higher, and is not convinced that the plan would answer to the degree expected. Still, Mr. Dibdin has facts to rely upon, as shown by his long series of experiments; and if there is to be an expenditure of money, the outlay for the softening process falls far short of what is necessary to get a supply from Wales. The Companies may demur to the cost of Clark's process; but the system is one on which they may at any time fall back, as affording a complete defence against the Welsh scheme.

PERSONAL.

The personal estate of the late Mr. G. Ambrose Wallis, J.P., Resident Engineer of the Eastbourne Water Company, has been sworn at £85,438 gross, and £64,262 net.

Mr. J. H. Pye, assistant to Mr. Robert Hunter, of Chester, has been appointed Manager of the Barbadoes Gas-Works, and will leave England on the 11th inst. to take up his duties.

The Bolton Corporation have, on the recommendation of the Water Committee, advanced the salary of Mr. R. H. Swindlehurst, their Engineer, by £100 per annum. Other advances were also made.

Mr. J. F. Bancroft, Assistant Engineer and Manager of the Barnet District Gas and Water Company, has been selected for the position of Chief Engineer to the Hull Corporation Water Committee, at a salary of £450 per annum.

The appointment by the Leeds Corporation Gas Committee of Mr. John Bond to the managership of the New Wortley station was confirmed by the City Council last Wednesday. The remuneration attaching to the office is £300 per annum, with house.

Mr. W. S. M'Gregor, formerly the Engineer and Manager of the Imperial Ottoman Gas-Works at Constantinople, has been appointed Manager and Secretary of the Longton Corporation Gas-Works, in succession to Mr. W. W. Hulse, who recently resigned the position.

Mr. J. Merrell, the Deputy-Manager of the Gaythorn station of the Manchester Corporation, has been promoted to the position of Manager, rendered vacant by the death of Mr. Henry Lyon; Mr. A. Rhodes, draughtsman at the station, succeeding Mr. Merrell.

Prize for an Acetylene Lamp.—The Société Industrielle de Rouen is offering a silver medal for the best lamp submitted for the generation and burning of acetylene.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 35.)

Business on the Stock Exchange last week was quiet on the whole; and the course of the markets was somewhat chequered. Things were very dull at first; and flatness was the prevailing feature—Americans being the chief sufferers. But after the turn of the half year, the inflow of money had its effect in sending prices up, especially those of the gilt-edged character; and on Wednesday, Consols were done at 114 for next account. There was a good deal of excitement in home rails, owing to the Midland pronouncing for the ingenious process by which operators get something more than two shillings out of a split florin. Movements in other quarters were unimportant—mostly adverse, except in some of the miscellaneous undertakings which are skilfully manipulated. The Money Market did fairly well over the requirements for the close of the half year; but now it is slacker than ever. Business in Gas was very quiet indeed in the earlier portion of the week; but it quickened up towards the end. The chief feature was the demand for Gaslight "A," which made no great show at the opening, and on Wednesday was done as low as 313½; but from this point it rose smartly, and marked 318 on Saturday—just within the 4 per cent. for money figure. Changes generally throughout the list were not numerous; but all of them were in the upward direction. Gaslight secured issues were very little dealt in; and prices were not remarkable. South Metropolitans were hardly touched; but the "B" changed hands once at 320—top price. Commercials were in much the same position; the old stock marking 347. Only one or two transactions were effected in the Suburban and Provincial group; and no change took place in any of the quotations. The Continental Companies were strong, and rather more active; some nice improvements being scored. Imperial rose to 255; and European issues commanded very good figures. Tuscan debentures are fractionally better *ex div.* In the remoter world, Australian debentures are similarly affected; and Belgrano shares are higher. The Water Companies were very quiet; and changes are irregular. New River and Kent are higher; but East London, Lambeth, and Southwark have receded.

The daily operations were: Business in Gas issues was extremely quiet on the opening day; but the tendency was favourable. Imperial Continental rose 1. In Water, Southwark fell 2; but New River debenture was 2 higher. Transactions in Gas remained quite as limited on Tuesday. But still everything was firm; and Imperial Continental again rose 1. Southwark Water fell 3 more. Business was better on Wednesday, though it did not amount to much; and quotations did not vary. Thursday was more active—Gaslight "A" being in demand at better prices; and the quotation rose 1. Imperial Continental and Belgrano gained ½ each. Transactions on Friday were about the counterpart of Thursday's, and prices still rose. Gaslight "A" and Imperial Continental improved 1 each. East London Water fell 2; but Kent advanced 4. Saturday was fairly active, and very strong. Gaslight "A" and both Europeans gained ½ each. New River rose 2.

ELECTRIC LIGHTING MEMORANDA.

The Policy of Entrusting Electric Lighting to Gas Committees—Hard Treatment of an Electricity Supply Station by a Gas Committee—The Other Side of the Case—The Unprofitable Nature of Small Electric Lighting Undertakings.

It is not often that we find ourselves at variance with our electrical contemporaries. Considering the opposite standpoints from which we and they naturally observe the course of the electric lighting and gas industries, it is remarkable how often our respective opinions and judgments agree. It will not be presumptuous if we venture to explain this pleasing fact by referring to the existence on both sides of a desire, of which abundant proof has been given, to tell the truth and act fairly by all matters and persons dealt with in the ordinary course of editorial duty. We can claim for our electrical contemporaries, as well as for ourselves, that we all have too much respect for, and too sincere a faith in, the merits of our respective causes, to descend to the imposition and garbling of evidence by which some individuals have sought to secure an advantage for the case with which they have identified themselves for the time being. It happens, however, that for the moment the "Electrician" has to find fault with us for taking a view opposed to that of Mr. Arthur Wright, of Brighton, as to the consequence of entrusting a municipal electric lighting venture to the tender mercies of a corporation gas committee. It is Mr. Wright's opinion that it is asking too much of the impartiality of such a committee, and especially of a corporation gas engineer, to expect them to show fair play to an electric lighting station. We took exception to this view of the case, and asserted, to the contrary, that the electric lighting is always favoured at the expense of the gas undertaking.

The "Electrician" now declares that this statement of ours is "somewhat sweeping;" and asserts that some municipality—

name not mentioned—the "owners of a well-to-do gas-works," have to its knowledge been guilty of the heinous crime of "defeating the intention of a company to obtain a Provisional Order, by hastily undertaking a little electric lighting themselves, and then starving the new concern in every possible way. The electric lighting department, for instance, has been made to purchase coke from the corporation gas-works at a ridiculously high price, though the fuel is utterly unsuited to the particular type of boiler adopted; while the consumers have been stemmed back by high prices, and by preposterously high rentals for meters, and even for house transformers."

We should like to be furnished with the name of this peccant municipality, "not necessarily for publication," nor even as a guarantee of good faith, which may be conceded to our contemporary; but simply because we believe, on general principles, that there must be another side to this picture of the wolfish gas committee and the lamb-like electrical speculation. Let us meanwhile discuss the case as presented. To begin with, there is that "hasty" plunge into electric lighting, to spite an enterprising company. We have heard many such tales; and we know that company. It is one of a large family, all iniquitously dispossessed of an inheritance that never was theirs, by the selfishness of local authorities bent upon keeping their thoroughfares to themselves. And then the "haste" on the part of the municipality—this would probably be found, on fuller inquiry, to be a hurry that extended over several years, eventuating in a small venture deemed to be necessary at last for the saving of the Provisional Order.

It may be granted that this is not the most hopeful way of going to work to make electric lighting a commercial success. A company might be expected to go into the matter more heartily—always supposing there was the remotest prospect of making a paying business of it in the long run. This, of course, is an argument for leaving electricity supply to companies, which is a position that we have always supported. There are localities, however, where popular sentiment would look upon the intrusion of an electricity supply company as a positive nuisance—where the gas and water supplies, the tramways, and so forth, are already municipalized. Here electricity supply, if it is to be given at all, must also be municipal business; and so the corporation take it in hand, frequently without the smallest delusion on the score of its commercial value. There are many of these undertakings, which are established, not with a view to their paying, but in order to stamp the town as up-to-date in its appointments. And very properly so—within limits. The authorities of such towns are willing to serve customers with electric lighting, if they want it and are willing to pay for it as a luxury; but they do not see the justice of taxing the poor ratepayers for the benefit of a few rich residents or advertising tradesmen. So they endeavour to make the electric lighting station pay its way; and this is what the "Electrician" calls "starving" it.

For it cannot be too generally known that a small provincial electricity supply undertaking, whether owned by a company or by a corporation, can never pay its way and redeem its capital, under existing conditions. Only in the largest centres of population and commerce is this possible. Even Manchester can only just do it; and there are not many Manchesters or Brightons in the land. The small provincial electric lighting companies are seeking the shelter of municipal acquisition for a remnant of their capital; and the corporation ventures either stand confessed as costly luxuries, or are screened at the cost of the gas undertaking. It is more honest, of course, for corporations to admit the fact, and let the central electric lighting station stand on its real footing before the view of the ratepayers. But those local authorities that were cajoled into embarking upon the business by the promise of making a profit out of it, have not the courage to do this; and accordingly they hide everything up, refuse to provide for the future by a sufficient depreciation fund, and abuse gas and everything, except the lack of demand, for the unprosperous result of their venture.

A VIEW OF THE COMPETITIVE INDUSTRIAL SYSTEM.

At a time when advocates of Socialism are so blatant in every land, it is good to pay attention to the less frequent voices of those who essay to maintain the claims to permanence of the existing industrial system. The principles that underlie the great interests of civilization are far from being comprehended by the vast bulk of those whose material safety, happiness, and well-being depend upon their due observance in the every-day conduct of human affairs. To say nothing of the greater matters of faith and righteousness, which cannot be discussed here, it is obvious that the common and statute laws which preserve the community from disintegrating under the constant assaults of the primitive vices, are not embraced within the knowledge of those to whom they apply. Similarly, the foundation of the currency, which is the life of British finance, is beyond the understanding of most of those whose livelihood is bound up with the integrity of the pound sterling. It is the same with our industrial system. Most of us believe that this is soundly based upon principles of immutable validity; but it would puzzle us to give, at a moment's notice, sound and intelligible reasons for the faith that is in us in this regard. Thus it comes about that an opening exists for those denouncers of the established order who have never been lacking at any period of the world's history. We all know, in the recesses of our inmost consciousness, that all legal, social, and economic systems exist in the last resort by the common consent of those to whom they apply, and by no other warranty. Time and again in the history of the world have the most elaborate, the most familiar, and apparently the strongest, systems been overthrown by an alteration of the ideas of those who previously consented to them—alterations apparently wrought by the efforts of a numerically weak reforming party. All systems are exposed to the same risk, at all times; but it is sound philosophy to regard those that stand as doing so by reason of their continuing to satisfy, on the whole, the sentiments and requirements of the silent majority of their adherents.

It is doubtless the prevalence of a sense of this conclusion that renders the freest peoples the most tolerant of the declamations of those who find fault with existing arrangements. Time was when authority, engrossed in the difficult task of maintaining itself against recently-chained disruptive forces of all kinds, had a short way with those who questioned (even theoretically) the validity of its principles and methods. Now-a-days, the foundations of the social structure, laid in blood not always of the worst offenders against law and order, are sufficiently strong to enable its guardians to look with equanimity upon the efforts of those who think themselves called to assault the superstructure; and so we not only tolerate our Jack Cades, instead of hanging them, but even elect them to Parliament on the credit of their humane longings after the ideal of making a pint pot hold a quart.

This forbearance is due to the prevalence of the knowledge that a pint pot will never hold a quart—not because it bears the seal of authority to its proper capacity, but because this is part of the nature of things, which is not to be changed by inflammatory oratory. What is called the tolerance of Socialistic teaching in England at the present day, is mainly indifference to mere talk about ideals that could not be realized in their entirety without a preliminary radical reconstruction of human nature and a redirection of all its energies. Some mischief is done, meanwhile, by permitting these ideals to inspire the tentatives of hare-brained local politicians in the direction of Municipal Socialism, and the vagaries of Trade Union leaders; but these experiments cannot be carried very far without being brought up against hard economic and industrial facts. Whence arise lamentations and protests from the deluded persons who had allowed themselves to be persuaded into believing that a resolution of a Trades Council is competent to turn the course of industrial development.

It is as well, nevertheless, that those who have to live by, and take serious account of, industrial facts should be assured that these are by nature salutary as well as stubborn. Socialists declare that the existing industrial system is morally indefensible, however convenient its results may be to those whom it benefits; and few people, albeit convinced that this is not a true indictment, are fully equipped for defeating it. This is the service which was intended to be served by a recent meeting of Free Traders and others in London, under the presidency of Mr. Mundella, ex-President of the Board of Trade, when a debate, wisely preceded by a dinner, was opened on "The Ethics of Economic Competition." M. Yves Guyot, the celebrated French economist, was the first speaker. He began by going to the very heart of the matter—asking whether there is, in our existing states of society, a majority of persons actively employed in doing good to others, and who engage all their activity, their life, their strength, their intelligence in this practical altruism, upon whom this altruism is obligatory because bound up with an efficacious sanction. He maintained that there is such a majority, such an altruism, such a sanction. The majority is that of the individuals who are employed in productive functions—agriculturists, manufacturers, bankers, traders, with professional men to advise, protect, and keep them in health and working condition. Their altruism consists in the fact that the producer does not produce for himself, but for others. His first obligation, therefore, is to seek not that which flatters his own tastes or caprices, but that which is desired by those to whom he addresses himself, and whose custom he wishes to obtain. The sanction of this endeavour is the positive necessity for following it up, on penalty of failure to obtain everything that at all makes life worth living. This, according to M. Guyot, is the efficacious sanction that has held sway in the production and government of modern civilization. Misunderstood and striven against, this sanction has nevertheless acted during the last hundred and fifty years with remarkable power. Under its silent pressure, the producer has no need to consciously convert himself into an altruist with an abiding sense of obligation and painful effort. Free Trade does this without making a fuss about it. The producer has no need to remind himself that he must above all things think of others. His own interest renders this thought imperative with him. Colloquially and familiarly speaking, this is the "collar" to which every worker must submit his neck. The producer can earn nothing for himself save as the meed of giving satisfaction to others. Yet, while constantly preoccupied with pleasing them, he asks of men not the slightest gratitude for the trouble which he gives himself on their

account. Moreover, he urges no complaint against a competitor who tries to do better than himself, but strives to obtain pre-eminency for quality and cheapness, to the gain of everybody who has need of the commodity which he makes for the use of the world.

How different, said M. Guyot, is the spirit of the Protectionist and the Socialist! The first thought of men so inspired is to defend their position against external progress. They thus acquire habits of distrust and hatred, and throw the ferments of foreign war among peoples, of social war among individuals. The aim of the Protectionist is to subordinate the consumer to the producer, by suppressing or restraining competition. Under the system of economic freedom, the producer is obliged to put forth all his efforts to retain his customer, by furnishing him with better and better goods at a cheaper and still cheaper rate. The Protectionist practically asks the State to deliver the consumer bound hand and foot to the producer—to forbid him to deal with the Protectionist's neighbour, to force the customer to deal with him alone. "The Protectionist and Socialistic conception tends to produce idleness and lassitude in the individual, besides distrust, envy, and hatred of others. The Free Trade conception tends to produce an increase of energy and activity in the individual, and goodwill, confidence, and solidarity with regard to the whole of humanity." Thus M. Guyot, who claims to have demonstrated that Free Trade spurs one on to the practice of the highest moral virtues, even of those which appear to be the most inaccessible to the ordinary motives. He pitches his claim in this regard too high, as is the manner of advocates; but there is a good deal in what he advances which has not previously been so well argued.

M. Leroy Beaulieu, who followed on the same side, as the law reports say, kept nearer the mark by contending that competition is the great lever of human elevation; but it is not without its disadvantages. He argued, however, that these disadvantages are not so serious as those that would follow Socialism. He urged above all that the State should not be called upon to help in dealing with the evils of competition. "The State would first introduce its little finger, then its arm, and then its whole body; and the weight of the body of the State would be such as to prevent all future movement." Dr. Theodor Barth, speaking as a German, declared that "competition meant progress; and economic progress was of the greatest benefit to the working man." Obviously, if people would only see it, the lowest classes of the community, upon whom the weight of unfavourable economic conditions presses most hardly, must profit most in the long run from the greatest improvement of these conditions.

This is the kind of teaching that the industrial world wants now-a-days; and it is remarkable that the particular teachers whose words we have reproduced belong to European nationalities for the moment labouring under the rule of the most tyrannical Protectionism. Not the least objectionable aspect of his system lies in its creation of a netw ork of artificial interests which cling round the body of a national industry so closely as to place enormous difficulty in the way of its natural growth. So it is with the Trade Unionism which a combination of interested and well-meaning but ignorant persons posing as philanthropists are trying to force upon British industry. Industry must be free before it can be progressive; and therefore those employers are justified who are prepared to dare everything rather than submit to the domination of the disguised advance Socialistic forces known as the New Unionism.

It could be desired, however, that men like Messrs. Guyot and Beaulieu would turn their attention from the general advantages of Free Trade to those particular industrial workings —as, for example, the Joint-Stock Company system—which take such different lines of development in different countries. It is well to be reminded of first principles occasionally; but after all it is detail developments that usually constitute "human nature's daily food." A good railway system, a wise ordering of gas and water supply, a well-directed course of public sanitation —these are some of the matters that take form apparently independently of all considerations of abstract economic doctrines; and it should be the care of the doctors and professors to ascertain and make clear the link between the abstract and the concrete. For in these, as in other matters, it is by their fruits that doctrines must be made known for what they really are.

The Miners' Federation.—A meeting of the executive of the Miners' Federation of Great Britain was held on the 25th ult., at the Westminster Palace Hotel, under the presidency of Mr. B. Pickard, M.P. The proceedings at a conference held on the previous day with the coalowners were discussed; and it was decided to issue a circular to the districts, laying before them the suggestions made on both sides. The coalowners proposed a reduction of 10 per cent. in wages after the 1st of August, for a period of twelve months from that date, at the expiration of which period the whole question should come before the Conciliation Board for consideration. The representatives of the miners proposed that wages should remain as they are until seventeen months after the 1st of August, after which the Federation shall be entitled to go before the Board for an advance. The districts are asked to vote on these prop osals.

NOTES.

Analysis by Photometry.

Mr. J. I. D. Hinds has communicated to the "Chemical News" the particulars of a photometric method for the quantitative determination of lime and sulphuric acid in drinking water. He states that the want of a rapid method of making this determination with a close approximation to the correct amounts, led him to study the opacity of fine white precipitates suspended in water. He precipitated in weak solutions lime with ammonium oxalate, and sulphuric acid with barium chloride, and then measured the height of a column of the liquid containing the precipitate through which the flame of a candle became invisible. He expected only a rude approximation; but he has found to his surprise that, within certain limits, a degree of accuracy is attainable equal to that of the ordinary volumetric method. The only apparatus needed is a cylinder graduated from the bottom in centimetres and tenths—the bottom being plain and polished. The measurement is made by holding the cylinder about 12 inches above the candle-flame, looking downward through the cylinder, and pouring in the liquid until the flame just disappears from view. The experiment can be tried with a very dilute solution of calcium chloride, in known proportions, precipitated with solid ammonium oxalate. As a method of chemical analysis, Mr. Hinds declares this to be very delicate. It requires, however, a light of constant intensity; and the personal equation of the operator must be determined. Mr. Hinds thinks it will be of use to the water analyst; but the idea of employing the same process as a photometer does not appear to have so far occurred to him.

Uranium as a Radiant.

A remarkable property of uranium and its salts has been noticed by Professor Henri Becquerel and M. Moissan. The former discovered some months ago that the salts of uranium emit radiations of a kind as yet unknown to science, some of which possess properties comparable with those of Röntgen rays. The radiations of the uranium salts are emitted not only when the substances are exposed to light, but even when they are kept in darkness. For more than two months M. Becquerel has kept the same fragments of various uranium salts secluded from any known exciting influence, and has found that they continued to emit new radiations almost without appreciable decrease. As all the uranium salts studied by M. Becquerel gave him similar results, he was led to think that the effect was due to the presence of the element uranium in these salts, and that the metal itself would give effects more intense than those of its compounds. Experiment with commercial powder of uranium confirmed this expectation; and M. Moissan has obtained the same results with uranium reduced by himself in the electric furnace. This is, according to M. Becquerel, the first known instance of a metal presenting a phenomenon of the order of invisible phosphorescence. M. Moissan finds among other properties of metallic uranium that it burns in pure oxygen, and also combines with selenium, with incandescence. Generally speaking, uranium resembles iron, but oxidizes more freely, and has a previously unknown affinity for gaseous nitrogen.

A New Proposal in Photometry.

"Electro-Chemical Actinometry" is the formidable title of an article by M. Maréchal, the chronicler of the arrangements for the lighting of Paris, as applying to some experiments instituted by himself with the object of measuring the electrical energy resulting from the impingement of light upon a copper plate covered with a thin film of oxide, and opposed to a second plate with a clean metallic surface. Both plates are made to dip into a solution of a haloid salt of an alkali metal, and the clean plate is protected from the light by a suitable envelope. The electrolyte should be dilute, containing only about 1 gramme of salt per litre. On connecting the electrodes with a sensitive galvanometer, it is found that the potential difference between the plates responds to small variations in the intensity of the light falling on the exposed plate, and also that the plate with the film of oxide is always positive to the plate with a clean surface. The effect is, however, very small; even direct sunlight not making a difference of more than 0·1 volt. Still, M. Maréchal claims to have ascertained that with artificial lights the voltage is inversely proportional to the square of the distance of the light—that is to say, it is proportional to the intensity of the light. By promoting selective absorption, the sensitiveness of the arrangement can be increased. Thus dipping the oxydized copper plate into a weak solution of green colouring matter increases the sensitiveness of the couple from four to eight times. It appears that in all cases the light does not act by virtue of accompanying heat radiations, nor by the so-called chemical rays, but by what M. Maréchal calls its "actinicity." Numerous uses for the actinometer are suggested —photometry being obviously one. Nevertheless, the "Electrician" remarks of it only that the arrangement seems to be an ingenious contrivance for measuring a mixed quantity; but that there is no evidence to show that the particular value measured is identical with that other complex entity, the special fraction of vibrations of a particular class which affects the human eye as light.

TECHNICAL RECORD.

WESTERN (U.S.A.) GAS ASSOCIATION.

The Annual Meeting at Chattanooga.

(Concluded from Vol. LXVII., *p.* 1463.)

The next paper was read by Mr. Malcolm S. Greenhough, of Cleveland (Ohio), and was entitled "The Future of the Gas Business of America." He addressed himself to the consideration of three heads—viz., Is the business itself to prosper? What sort of gas is to be made? and Who are going to make it? On the first point, he took the evidence furnished by the reports of the Massachusetts State Commission, which showed that the consumption of gas was steadily advancing, even in towns where the electric light had been established. The sales per mile of main were greater in 1895 than in 1889; and this showed that electricity was not seriously hampering the development of the gas business. This state of things obtained, he remarked, in a State where, on account of local circumstances, the price of gas was higher than in many other parts of the Continent, and where a larger proportion of the population than elsewhere could afford to indulge in any luxury they might fancy. In Cleveland, the consumption and sales per mile of main had increased much more rapidly, from which he argued that a cheap gas of moderate power was a better competitor for electricity than one that was higher both in quality and price. People wanted heat units as well as light units; and he had come to the conclusion that an unenriched pure coal gas, of 16 to 17 candle power, was the best to supply. He had no faith in producer gas for general use; but the utilization of products from coke-ovens might have the effect of rendering coal gas more costly, and so turn the scale in favour of water gas. But against this probability, it must be remembered that the price of petroleum had risen, and was going still higher. The extinction of natural gas wells was a matter of time; and when this occurred, there would be a larger demand for coke. So he predicted that, in five years' time, the percentage of coal gas made in America would be much larger than it was to-day. As to the future, he took a hopeful view; believing that jobbery and corruption would be replaced by an honest and civilized method of managing City and State affairs, and the gas companies would be allowed to settle down under a fair system of regulated monopoly. There were four ways of carrying on the gas business. The local company, which might be statutory or non-statutory, the large undertaking owning gas-works in several different towns, and municipal ownership. He was decidedly against the latter method, as it did not offer any prospect of meeting the needs of the consumer; and though universal suffrage may be, on the whole, a good thing for the country, it did not tend to fill the city councils with the class of men they would select to manage their own private affairs. He believed that the business intelligence of the country would eventually get the upper hand, and that national politics and municipal business would be absolutely divorced. But it would be a long day first. If anyone was disposed to question this view of municipal ownership, he had only to refer to the cities where it had been tried; and the larger the city, the worse he would find the case. Competition had also proved an utter failure from the gas consumers' point of view, and regulation was the last alternative. This had been adopted in Massachusetts for the last ten years, and with highly satisfactory results. In Ohio, the conditions were rather more favourable to the public; for in this State the municipalities had some voice in regulating prices, and could make a bargain on reasonable terms with a gas company, for a period not exceeding ten years. Popular sentiment was tending towards this, rather than to State Commissions. His own impression was that the public had a right to claim some consideration for the use of the streets; and he believed that most of the large gas companies would eventually terminate their disputes with the municipalities by paying over a portion of their receipts.

Mr. Humphreys, in opening the discussion, questioned some of the conclusions arrived at by the author. The comparisons quoted were a little unjust to Massachusetts. He also thought that, as far as illuminating gas was concerned at any rate, the improvements in quality and the introduction of richer gas had a great deal to do with increased sales, and argued in favour of 26-candle mixed gas, which would not be more costly than 17-candle coal gas. To his mind, producer gas would have something to do with the future of their industry; for though it was probably not over 10-candle power, it could be cheaply enriched by means of water gas. General Hickenlooper agreed that the gas of the future was 17-candle gas, and that price was more important than quality. But he did not believe in a special tax on the gas for the benefit of the public, which would really be a tax on the consumers. Captain White very strongly supported the view that 17-candle coal gas would be the gas of the future; and he thought the direction of improvement would be in the production of large quantities of coal gas in some compact apparatus, as water gas was now made. Any amount of illuminating power could be obtained by means of incandescent burners. He also agreed that municipalities had a right to some slight share of the receipts, in return for the franchise. One of the greatest mistakes of the early days of gas lighting was the idea of secrecy. The gas industry had been much more prosperous since the establishment of Gas Associations, and the publication of authenticated reports. The public had now learned that the gas business was one of the greatest manufacturing industries of the country, which required to be conducted with economy, skill, and care to ensure success. The sooner the public realized that they were selling gas at the lowest possible price, the better it would be for all of them. Mr. Clark thought that the day of low-power gas would only be brought about by the development of the incandescent system, and that the author's arguments in its favour were poor. His experience was that much of the business which the author of the paper considered to have irrevocably gone over to the electric light could be got back and retained, by supplying a high-quality gas. He agreed that the public were entitled to some consideration in return for the use of the streets. Mr. Jenkins would like to know, if gas companies were to pay a special tax for the use of the roads, why coal dealers, express parcel agencies, and the numerous other traders who used and injured the roads much more than the gas companies, should not also be taxed, If this was done, there might be some fairness in the suggestion. The public inconvenience caused by gas companies was nothing as compared with that caused by those who were continually using the streets. Mr. Copley agreed that the publication of Government reports was the best thing for the gas companies, as most of the public believed that the profits were much larger than was really the case.

Mr. Greenough, in replying, said that enriched coke-oven gas would be very apt to give off smoke in burning; and in answer to the arguments in favour of high-quality gas, he referred to Boston, where 25-candle gas was supplied, and asked how many of the principal buildings were lighted by electricity. He thought that the electric light had displaced gas to a greater extent in this city than it had at Cleveland. What was fair for gas companies also applied to street railways, electric companies, and others who tore up the streets when they pleased; but he did not think the man who simply drove about the streets stood on the same footing.

The "Wrinkle Department" was next submitted to the Association by the Editor (Mr. George T. Thompson), who commenced by describing the application of a weighted float or bell to the regulation of the air-blast in water-gas apparatus, by actuating a throttle-valve. A system applicable to quick-speed engines was also mentioned. A travelling hopper running on overhead rails for charging water-gas generators, some details of clinker-doors, a method of arranging the steam-nozzle so that it could be repaired from the outside, the protection of the oil-nozzle from burning during heating up the generator, a pressure register connected to the outlet for registering particulars of the work done, and the arrangement of the test light, were other "wrinkles" connected with water gas. A useful suggestion was the arrangement of a light tube with slip-joints, in connection with the air-blast, by means of which a supply of fresh air could be carried into scrubbers or other apparatus laid off for cleaning, for the benefit of the workmen engaged. In connection with main-laying, attention was directed to the advantage, in the case of mains of 10 inches or more in diameter, of placing a few pieces of resin in the gate before pouring in the lead. Another gentleman finds a bicycle pump extremely handy for inflating rubber gas-bags. Mr. Donald M'Donald, of Louisville, uses a piston plug with a rope attached, which is threaded through each additional length of pipe just before laying, in place of gas-bags. In New Orleans, a contrivance known as a "rat," consisting of two piston plugs connected by a rod, was used to clear mains, being forced through by water pressure. Mr. Thompson concluded by offering several suggestive remarks for future "wrinkles."

Attention was next directed to the Question-box; and in the course of discussing its contents, Mr. Odiorne mentioned that he had lately laid nearly 2 miles of 12 and 10 inch mains; using only one lead joint in every 400 feet run, and making up the rest with neat cement. After yarning in the usual way, the joint is filled with rather thin cement; a second ring of yarn is rammed in, till the water oozes through the yarn; and the joint is finished off with cement putty. There was a long discussion on gas companies undertaking fitting; and it was generally agreed that if the local gas-fitters would do the work on reasonable terms, it was better not to make antagonists of them.

Mr. W. W. Goodwin, of Philadelphia, read a paper on the "Practical Use of Acetylene," and contended, notwithstanding the adverse views expressed by Professor Vivian B. Lewes, and others, that acetylene could be successfully mixed with non-luminous gases. He described the apparatus he had used—which included a specially devised generator for acetylene—for making a long investigation of mixtures of city gas with acetylene, including over 600 tests in all. The results showed that 4 per cent. of acetylene improved a 16-candle gas 50 per cent.; 6 per cent. raised it to 26 candles; 8 per cent., to 30; and 10 per cent., to 31·7. The city gas was a mixture of coal and water gas in varying proportions; but judging from the specific gravity, water gas was the principal constituent. These tests showed an average of over 10 per cent. increase for each percentage of acetylene added. From these data, and the known cost of calcium carbide, anyone could estimate the value of acetylene as an enricher. The mixture of acetylene was permanent.

After arranging several routine matters, the meeting closed.

IMPROVEMENTS AT EAST GREENWICH.—TUNNELLED RETORT-BENCHES.

The East Greenwich station of the South Metropolitan Gas Company is one of the points for which the gas engineering pilgrim visiting London has learnt to make, not merely for the satisfaction of a legitimate curiosity to see the "largest gas-holder in the world"—for this may be gratified without taking the trouble to go very near the site of the works—but because the scheme of the station in the general, as well as in detail, is a lesson in thrifty design and efficient management. It is some time since we had a particular call to inspect the East Greenwich works; but in the course of last week attention was directed again to a not very astonishing patent notice that appeared in the "JOURNAL" for May 5 last, in which Mr. M. J. Joyce claimed protection for an improvement in carbonizing plant consisting of a "combination with gas or other retorts of a tunnel or alley with openings from the sides thereof to the ash-pits and furnaces, and arranged so that the furnace-bars can be clinkered, and the furnaces and ash-pits cleared, without the operators being exposed to danger from coke, tar, or the like, falling from the retorts." We were informed that

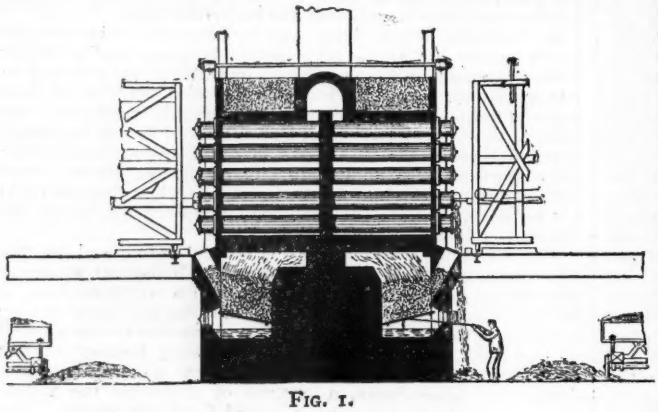


FIG. 1.

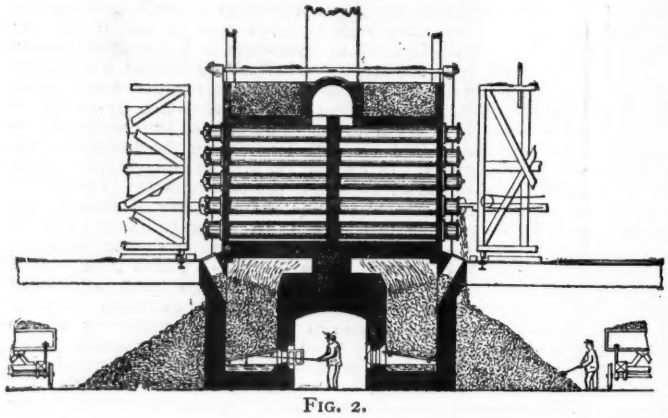


FIG. 2.

this modest patent, which might easily have been overlooked by the most diligent searcher after meritorious novelties in gas engineering construction, really covered an improvement of vast economical possibilities, and that a realization of it was to be seen, by permission of Mr. J. Tysoe, the Resident Engineer at East Greenwich. So without unnecessary delay we went to see it. One of the accompanying illustrations shows what it is that Mr. Joyce has patented—and that has been on view, be it said, at East Greenwich for several years past in a more or less perfect shape.

The first figure represents a transverse section through a stage retort-house of modern proportions, with settings of tens worked by machinery, and heated by pairs of gas generator furnaces (not regenerators) having an overhead main flue. There is nothing remarkable about this design. The furnaces are worked from the face of the bench, the fireman having to share the coke-floor with the falling coke, and the latter needing to be cleared out of his way, and loaded into the trucks which appear in the background. The next illustration exhibits the Joyce improvement in operation. There is the same retort-bench, with the difference that a tunnel has been pierced through what the French would call the *massif* of the bench; and the clinkering-doors of the generator furnaces open into this tunnel instead of into the coke-floor. A slight modification, on the face of it; but nevertheless one that carries several undeniable practical advantages worthy of particular attention in a large works. In the first place, the firemen are able to work in complete security from the risk of injury by falling substances which is inseparable from the usual arrangement; they have their work more conveniently under their hand; and they are in consequence able to attend to a larger number of furnaces. The tunnel is not at all hot or stuffy to work in, with the system of firing practised at East Greenwich, although this involves a pair of furnaces to every setting, the clinkering-doors being directly opposite one another. Next, the capacity of the coke-floor for holding coke is practically doubled with the new arrangement, by which the coke can remain piled up against the face of the bench, and is only handled once in putting into the trucks. The nature of the change will be understood from a glance at the two sections. At East Geeenwich, the saving of wages from this source alone amounts in positive figures to 12s. per week per bench; and there is a corresponding economy in a reduction of the quantity of breeze made. The pan ashes and clinkers, moreover, cannot get mixed with the coke; and there are other minor, but real, advantages attendant upon the physical separation of the firemen from the "cokeys"—each class of workmen having their own subterranean region to themselves.

It will be noticed that several concurrent conditions must exist to render the realization of such an arrangement possible. At East Greenwich, the commencement was made by the provision of the axial tunnel, which simply took the place of the underground main flue which belongs to the regenerative system of retort firing. This system was not successful at this station—possibly through the settling of the retort-benches in the early days, which demoralized the air and spent-gas flues. At any rate, for whatever reason, the regenerative settings were altered, greatly to the relief of the management, to simple generators with an overhead main flue. This dispensed with the underground main flue; and Mr. Tysoe accordingly had the idea of enlarging the opening, and making a tunnel of it, partly with the object of lightening the weight of the bench upon the compressible subsoil. Contrary to what might have been expected, the tunnel so constructed was not at all a sultry place; and this fact suggested the afterthought of making the furnace clinkering-doors open into it. As things have turned out, the idea has proved fruitful of considerable economy; but precisely how much "invention" there may be in it, is not for us to state. It will be news to us if anybody can patent a tunnel through a retort-bench—such tunnel, moreover, being made by somebody else, in substitution for a superseded main flue; and there is no invention in putting a clinkering-door on one side of a furnace instead of another. There may be, and undoubtedly are, many real inventions which do not possess the economical advantages of a re-arrangement and adaptation of common structural elements such as we have been describing. But economical advantage alone does not constitute invention; and if any gas manager possessing the requisite facilities were to-morrow to copy the East Greenwich retort-house improvement, on his own risk, it is difficult to see on what grounds anybody could stop him.

The East Greenwich carbonizing plant is worth inspecting on other accounts than that of the converted main flue. The standard setting is tens, in pairs; and these retorts are worked very conveniently by machinery. Mr. Tysoe prefers 21 in. by 15½ in. ⏢ retorts as most suitable for the latter purpose; a comparatively deep retort being easier for the mechanical rake to negotiate. He has had no trouble with stopped ascension-pipes, since he insisted on the use by the stokers of a large auger, just half-an-inch less in diameter than the inside of the 6-inch pipe. Formerly, under the rule of the Union, the stokers considered their duty done if they got a hole of any size pricked through the pipe; and in those days the retirement of a stoking gang to their lobby was the signal for the appearance on the stage of an army of pipe-jumpers, who slacked off the lids that had just been closed, and proceeded at their leisure to clear the pipes in their own fashion—the gas meanwhile flaring away in futile testimony to the excellence of the heats. Now all this is changed. The pipes have to be properly cleared before the stokers go on with their work; and if a pipe stops up, the men have to come back and put it right. This is the result of the use of a full-sized auger, under the supervision of a foreman who knows that he will be held responsible for the state of the pipes. Moderate heats, of course, are another feature of the working. A make of about 6250 cubic feet of gas per mouthpiece, from Durham coal, yielding about 10,250 cubic feet per ton; simple generator furnaces clinkered every 24 hours; retorts kept at work for above 1500 days—these are the non-heroic, but reliable standards of carbonizing worked to at East Greenwich. It is not a record-breaking style of carbonizing; but the manager of a large works learns from experience to be content with mediocrity in all matters which must be left under a division of responsibility.

Mr. Tysoe sets his retorts with a camber of about 4 inches in the middle. This allows for subsidence; and if there should be no sinking, the slope favours the drawing without interfering with the charging. He uses very largely the modification of the self-sealing lid invented by himself and another—Tysoe and

Mitchell's patent*—which has many points to recommend it, especially for machine-worked retorts. The pressure of the fastening is brought upon the lid at two points, where it can be readily adjusted; the weight of the lid is more perfectly carried; the fastening is more effective and out of the way; and there is facility for slacking off the lids and firing without causing the objectionable "rap." The great recommendation of the improvement for machine stoking is the clear-way it affords along the front of the settings—there being no handles to stick out, or be banged into place with a rod at the imminent risk of breakage; while for all retorts and furnace doors, the adjustability of the lids, and ease of fastening them tight, are bringing the system into extended use. Altogether, there is a good deal to be noted and pondered over in the carbonizing and other departments of the East Greenwich works of the South Metropolitan Gas Company, which appear to be developing very satisfactorily on the lines laid down by Mr. George Livesey.

AN ANTI-VIBRATORY FITTING FOR INCANDESCENT LAMPS.

The extreme sensitiveness of incandescent gas-lamp mantles, and their liability to collapse, under sudden shock or violent vibration, is well known; and the absolute necessity for some means of protecting the mantle from such liability to injury, before it can be satisfactorily applied for public lighting or use in workshops, has led to the introduction of several devices for overcoming the effects of vibration or shock to which the lamp may be subjected. For a considerable time past, Messrs. W. R. Clay and Co., of Bolton, have been conducting experiments, aiming at the production of an appliance which would render the incandescent lamp suitable for street lighting. They have proceeded on the lines that the incandescent systems will have the best chance when they can be made to conform as closely as possible to present conditions—that is, without any material alteration having to be made in the lanterns and fittings now in use, and without in any way hampering the lamp cleaners or lighters in their work; and they have succeeded in producing an anti-vibratory appliance which, in a very simple and effective manner, completely protects the mantle from destruction, through any shock or vibration which could be produced by the heaviest street traffic. The appliance, it will be remembered, was alluded to by Mr. Alderman Miles in the course of the discussion on Mr. Dexter's paper at the recent meeting of The Gas Institute.

Messrs. Clay were induced, in the first place, to carry out these experiments with the view of meeting the requirements of the Bolton Corporation, who some time back introduced the incandescent system for their street-lamps. The exceptionally

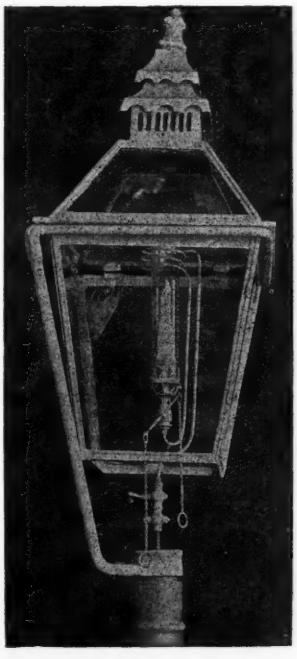


FIG. 1.

heavy traffic passing through the streets of this important centre of the cotton manufacturing industry and the engineering trades, however, caused an amount of vibration which was absolutely fatal to the fragile mantles of the incandescent lamps; and the constant collapse of the mantles became so great a source of expense that, very reluctantly, the system had to be abandoned. The very simple design which Messrs. Clay have now introduced, and which is shown in the accompanying illustrations, has enabled the Corporation to return to the system of incandescent lighting. Messrs. Clay's anti-vibrating appliance has now been in use for the last six weeks, with the result that during that period not a single mantle has been broken by the vibration, while previously there were numerous collapses every night the lamps were burning. This arrangement has, in fact, given so much satisfaction to the Corporation, that they are considerably extending their lighting on the incandescent system, and have placed further orders with the firm for the supply of their anti-vibratory fittings.

Briefly described, the arrangement which Messrs. Clay have introduced consists in detaching the burner altogether from direct connection with the service-pipe, and practically suspending it up a specially manufactured solid drawn copper tube, about 5 feet in length, ⅛-inch bore, and of 21 metal; this tube being directly attached to the service-pipe. The manner of constructing this light copper tube, so as to suspend the burner, will be seen in fig. 1, which shows the incandescent light, with its anti-vibratory fitting, attached to an ordinary street lamp-post. The tube is slightly to one side, immediately under the burner, and then carried up to near the top of the lamp-chimney, round which it coils several times, and is then taken down again outside the chimney to the incandescent burner. By this arrangement, the burner and chimney are held practically in a spring coil, which gives a resilient suspension to the burner—allowing it to move freely in any direction, and effectually overcoming any shock or vibration which would be at all injurious to the mantle.

With the object of thoroughly testing the complete efficiency of this arrangement, Messrs. Clay have submitted their appliance to some exceptionally severe tests. A lamp furnished with one of these fittings was subjected to a shock so violent that, while the chimney glass of another burner in its immediate proximity was broken in two at the moment of impact, the mantle in the lamp fitted with the anti-vibratory arrangement was not fractured in the least, though both burners were equidistant from the point of impact, and each at the summit of a standard fixed to the top of a bench. Further tests were applied with

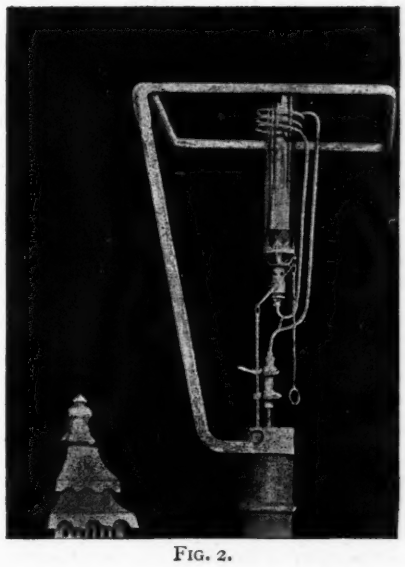


FIG. 2.

successive shocks caused by lifting one end of the bench 9 to 12 inches from the floor, and suddenly letting it fall; but these failed to fracture the mantle. Messrs. Clay state that they have been unable to fracture the mantles by the most violent horizontal and oblique shocks against the lamp-pillar, short of overturning the whole structure. The lamps have also undergone further severe tests in a neighbouring engineering works, where an incandescent lamp hung upon one of the fittings described has been placed in close proximity to a couple of powerful steam-hammers, working night and day, for the last three weeks, without suffering any perceptible injury. Tests were also made, in the presence of our representative, at Messrs. Clay's establishment in Bolton, during a visit last week. One of the incandescent burners suspended on their anti-vibratory fitting, and attached to an ordinary street-lantern, was subjected to exceptionally violent horizontal and oblique shocks—much more violent, in fact, than would be probable from the heaviest street traffic; and neither the chimney nor the mantle was in the slightest degree affected. Less severe tests, however, applied to two incandescent lamps fitted up in the ordinary way, and attached to the top of a bench, immediately brought about the complete collapse of the mantle.

In addition to the effectiveness of the arrangement for overcoming vibration and shock, Messrs. Clay have also kept in view the necessity for freedom of movement, so that it may be possible to as easily remove the lantern from its cradle when an incandescent burner is inside as it is now with an ordinary burner,

* See "JOURNAL," Vol. LXV., p. 902.

Fig. 2 represents a street-lamp supplied with the anti-vibratory fitting, but with the lantern removed from the cradle—showing that there is no connection to be broken in order to effect this operation. In fact, the simplicity of the arrangement is perhaps as important a feature as its efficiency. The gas has direct access from the main to the burner without the intervention of any other connection; and there is absolute freedom from loose parts or fittings requiring renewal—the whole of the appliance being one solid piece of metal throughout.

We understand the only objection that has been raised to this appliance is that possibly there might be an accumulation of naphthalene in the bend of the tube immediately under the burner. Messrs. Clay's answer to this, however, is that the gas, in its passage through the tube to the burner, is both heated and dried, so that there is no possibility of an accumulation of any liquid in the bend; while a further advantage of the heating of the tube is that it is a very efficient protection of the chimney from fracture, by preventing a too sudden cooling of the glass. It may be added that, although the illustrations show a simple form of the appliance for the present "C" burners, Messrs. Clay are preparing another design for the bulb burner, which is coming into use for lighting large areas; and they are also designing a bye-pass arrangement in connection with the fitting, by bringing a small tube from the service-cock to the burner above. They likewise propose to utilize the principle for other than street lighting, as they are satisfied their arrangement must prolong the life of the burner under any conditions, even in domestic lighting.

THE USE OF STANDARD CANDLES IN PHOTOMETRY.

The "Physical Review" for May-June this year has a descriptive article by Mr. Clayton H. Sharp of a method he proposes for the use of standard candles in photometry. The following abstract gives the essential points of his article:—

The intensity of light emitted by a candle used as a standard is assumed to be proportional to the rate at which the material of the candle is consumed. But Liebenthal* and Methven† have shown that the intensity of light from a given source is affected by the purity and hygrometric state of the air. Granting, however, that the fundamental assumption is permissible, we ought to know the rate of consumption at the instant a photometer setting is made, and not the mean rate over a period, which is that actually used in correcting observations. The quantity of light emitted by a candle is subject to enormous and rapid variations, which may be observed by exposing a sensitive bolometer to the radiation from a candle-flame. It is therefore possible that the mean of a series of photometric settings may differ considerably from the mean covering the whole time between two weighings of the candle. By bolometric observations also it may be proved that the total radiation—and, therefore, in a normal candle-flame, the luminous radiation—is not strictly proportional to the rate of consumption. The German practice assumes that the luminous radiation is proportional to the height of flame.

If a relation exists between the height of the flame and the intensity of light emitted, it would be desirable to measure the height of the candle-flame at the instant a photometer setting is made. Liebenthal has shown that such a relation exists in the case of the Hefner lamp and the English standard candle, and that the curves showing the relation are approximately linear in both cases. Two curves for the English candle show variations of 2·1 and 1·9 per cent. per millimetre for flame heights ranging from 40 to 50 mm. (1·5748 to 1·9685 inches).

In the present experiments, two methods were employed to determine the ratio of flame height to intensity. In the first, bolometric observations of the intensity of the radiation of the candle were made, and the height of the flame measured at each observation by the aid of an ingenious camera device resembling a Krüss optical flame-measurer. The galvanometer deflections and the flame-heights were observed simultaneously, and plotted as co-ordinates. In the second method, a 110-volt glow lamp, run at a voltage of 100 from a storage battery, was placed at one end of the 200-inch bar of a Lummer-Brodhun photometer. At the other end of the bar was placed the candle with the curl of the wick perpendicular to the axis of the bar. An image of the candle-flame was reflected from a mirror, and projected by a lens on a graduated screen. This arrangement enabled one observer to make a rather quick photometer setting, then at once note the height of the image of the flame on the screen, and afterwards to read the photometer. The observed values of flame height were collected in groups, each covering a range of 1 mm., and the mean, of each group found, and also the mean photometer reading corresponding. The candle power of the glow-lamp was determined by taking the means of all the heights and photometer readings, and reducing, by an approximate correction, to a standard flame height of 45 mm. (1·7717 inches). From the value so determined, the intensity of the candle corresponding to each group was computed; and by plotting the results, the percentage variation per millimetre of flame height was found.

To compare the accuracy of this and the ordinary method of using candles, a number of sets of observations were made, in which the candle was weighed and the flame height also noted. The mean value of the candle power of the glow lamp was then found by correcting for the rate of consumption in the ordinary way. It was then corrected by reducing from the mean flame height to 45 mm. by using the mean value of the relation between intensity and flame height as determined from all previous observations. The mean candle power of the glow lamp corrected for rate was 5·64; the average deviation from the mean was 0·36 candle; and the mean percentage deviation was 6·35. The mean candle power corrected for flame height was 5·74; the average deviation from the mean was 0·125; and the mean percentage deviation was 2·16. Fourteen out of twenty values found by correcting in this way deviated by 2·1 per cent. or less from the mean value. In the case of corrections for rate, only one out of fourteen values deviated by less than 2 per cent., and only four by less than 4 per cent. In other words, by correcting for flame height, an error of less than 2 per cent. may reasonably be expected, and the probability of making an error greater than 4 per cent. is small; while in correcting for rate, errors of 8 per cent. are of common occurrence. The values found by both methods might be more consistent if observations made at extreme rates or flame heights were rejected.

The mean value found from all observations, both bolometric and photometric, for the variation in intensity of the candle is 2·7 per cent. per millimetre flame height, within the range stated above. The photometric observations confirm earlier bolometric results, which showed that the English candle is subject to sudden variations in intensity, which are sometimes as large as 15 per cent. Points were plotted showing the relation between candle intensity and time, and between flame height and time. The two curves obtained were very similar. The flame height gradually increased, and with it the intensity, until, when the height of 48 mm. had been reached, there was a sudden drop—the change in intensity amounting to 12 per cent.

The intensity of the glow-lamp was also measured in terms of the Hefner unit; and hence a good determination of the value of the latter in terms of the English candle has been made. Correcting for rate, the value found was 0·872 candle; correcting for flame height, the value was 0·892 candle. The mean value found in the Reichsanstalt investigations was 0·876,* by the Dutch Photometry Commission 0·921,† and by S. Schiele 0·881 English candle. The preponderance of evidence is therefore in favour of the Hefner unit, having a value of 0·88 English candle. Probably the best way at the present time of determining candle power is to use the Hefner lamp, and reduce by the use of this ratio.

Risks in Industrial Occupations.—The Council of the Society of Arts are prepared to award, under the terms of the Benjamin Shaw Trust, a gold medal, or a prize of £20. The medal, under the conditions laid down by the testator, is to be given "for any discovery, invention, or newly-devised method for obviating or materially diminishing any risk to life, limb, or health, incidental to any industrial occupation, and not previously capable of being so obviated or diminished by any known and practically available means."

Visit of the Institute of Secretaries to the Reading Gas-Works.—The members of the Institute of Secretaries visited Reading on the 27th ult. They were met at the railway station by Mr. A. H. Cane, the Secretary of the Reading Gas Company. The party first visited the Abbey, where they were joined by the Chairman of the Gas Company (Mr. J. Okey Taylor, J.P.), to whom the town is indebted for the preservation of the ruins during his mayoralty thirty years ago. After making an inspection of this interesting historical relic, under the guidance of the Rev. J. M. Guilding, the Librarian and Treasurer of the Berkshire Archæological Society, a move was made to the gas-works, where the members were received by the Engineer (Mr. E. Baker, Assoc.M.Inst.C.E.), his assistant (Mr. H. Baker), and other officials. Mr. E. Baker being unwell, the Chairman gave a lucid description of the works, which, as our readers are aware, have been reconstructed during the past eight years in accordance with the Engineer's designs, and under his supervision. The whole process of gas manufacture was fully explained. Before leaving, the party were entertained to luncheon, at which several of the Directors of the Company were present. The Chairman presided, and proposed "The Institute of Secretaries," coupling with the toast the name of the Secretary (Mr. Kenrick Murray). Mr. Murray acknowledged the compliment in suitable terms, and proposed a vote of thanks to the Reading Gas Company. In responding, the Chairman said it was always pleasant to find outsiders taking an interest in, and wishing to know a little more about, the details of gas manufacture. The Secretary (Mr. Cane) expressed his pleasure in welcoming the members of the Institute; and thanked the Chairman for the explanation he had given of the process of making gas, and Mr. Baker for the trouble he had taken in connection with the visit. Subsequently the members had a trip down the Thames as far as Maidenhead.

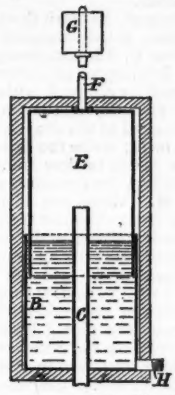
* See "JOURNAL," Vol. LXVII., p. 124. † *Ibid.*, Vol. LIV., pp. 968, 1011.

* See "JOURNAL," Vol. LXII., p. † *Ibid.*, Vol. LXIV. p. 1162.

REGISTER OF PATENTS.

Gas-Escape Indicator.—Bailey, C. J., of Fairfield, and Wilson, S., of Rusholme, both near Manchester. No. 11,120; June 6, 1895.

This gas-leakage detector consists of an external stationary cylindrical vessel B, partly filled with water, and having a vertical tube or cylindrical vessel C secured to, and projecting through, its base, immediately under which is fitted the tap or valve connected to the gas-service. The vessel E is fitted with a guide-rod F, having at the top adjustable balance-weights G; and it is free to ascend or descend within the vessel B. On opening the inlet-tap, the gas enters the interior of the vessel E, causing it to ascend to the top of the indicator; the

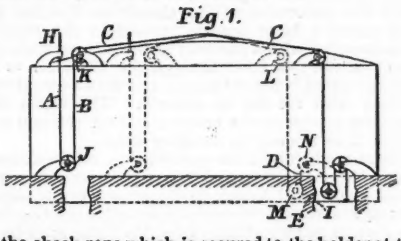


taps or valves of all fittings connected with the service of the building being previously shut. The tap is then closed, as is also the main-tap at the meter—thus cutting off the entire supply of gas. The weights G are then placed on the guide-rod F, and the tap again opened, when, if the vessel E retains its highest position, the service throughout the building is shown to be free from leakage. If, on the contrary, the vessel descends, the amount of gas escaping is shown by a graduated scale marked off in inches and fractions of an inch on the vessel E. The vessel B is fitted with an outlet H, to enable the water to be replaced by a fresh supply when necessary.

Guiding and Controlling Gasholders.—Pease, E. L., and Ashmore, Benson, Pease, and Co., Limited, of Stockton-on-Tees. No. 13,652; July 17, 1895.

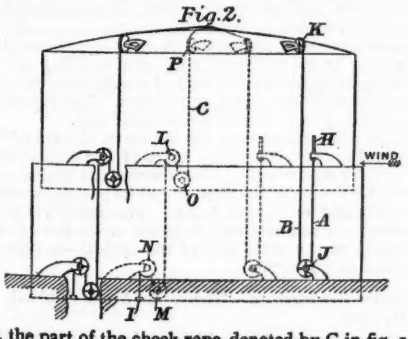
This invention—relating to means for guiding and controlling gasholders—is especially applicable to appliances "constructed in the form of ropes, chains, or the like tensile appliances trained over pulleys" in the manner described in patents No. 18,272 of 1888 and No. 7616 of 1890. The object in view is mainly to adjust the controlling strains transmitted through the check-ropes to the requirements of each lift of the holder, by training the ropes over systems of pulleys in a manner analogous to the ordinary pulley-block or sheave-and-rope arrangement, in which the lifting strain is transmitted through one or more folds of the rope according to the amount of purchase required; but the system of training the check-ropes in this manner can also be advantageously applied to a single-lift holder, inasmuch as an increased stability of the holder is said to be obtained.

Fig. 1.



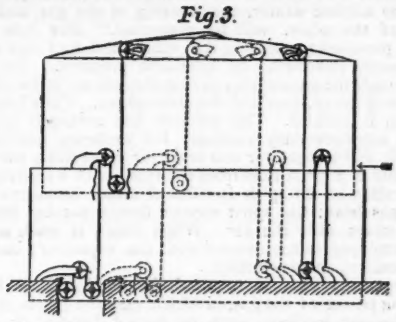
In fig. 1, the check-rope which is secured to the holder at the point H on the top curb and the point I at the bottom curb, is trained over the pulleys J K L M N; and two folds are formed—one A B passing round the pulleys J K, and the other D E passing round the pulleys M N. The mechanical advantage derived from this arrangement is a power-factor of two, or a double purchase, inasmuch as the travel of the check-rope between the pulleys K and M is double the vertical movement of the holder—in other words, the controlling power of the check-ropes on the irregular movement of the holder is doubled.

Fig. 2.



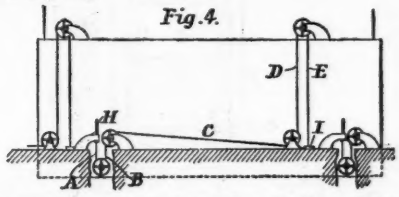
In fig. 2, the part of the check-rope denoted by C in fig. 1 is carried over an inner lift, by means of the additional pulleys O P, which inner lift is thereby guided and controlled in the ordinary way; but a double purchase controlling power is applied to the outer lift as in fig. 1.

Fig. 3.



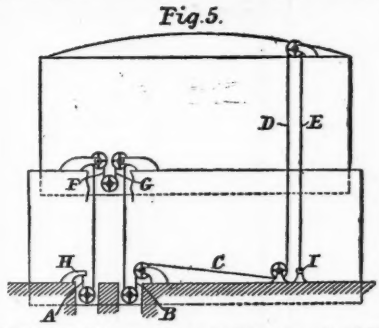
In fig. 3, the principle is carried one step farther by means of additional pulleys to increase the number of folds in the rope; and the arrangement applies a three-fold purchase to the controlling power of the check-rope on the bottom or outer lift—the inner lift being regulated as in the ordinary way.

Fig. 4.



Another convenient method of applying this invention is illustrated (as adapted to the outer or only lift of a holder) in fig. 4, and (to both the outer and inner lifts of the holder) in fig. 5. In this arrangement, the check-rope is secured to, and trained along, the tank aside. In fig. 4 H I are the points to which the rope is anchored, between which pulleys are placed in the positions shown, and by which folds are formed in the rope at A B and D E, giving by this means a double controlling power for maintaining the stability of the holder.

Fig. 5.



In fig. 5, the fold D E is carried up to the top curb of the inner lift; and the check-rope is trained over pulleys in the manner shown. A B forms the compensating fold on the bottom or outer lift; and F G the compensating fold on the inner lift. So that a double controlling power for maintaining the stability of the holder is applied in this case to either lift.

In a two-lift holder, it is found in practice that the strains developed in controlling the top lift are less than one-half of the strains similarly developed in controlling the lower lift. Consequently, when using the same check-ropes for both lifts, with the usual uniform or single purchase controlling strains throughout—that is, with the like number of ropes carried over the top lift as are secured to the lower lift—more ropes are used to control the top lift than are necessary in order to provide the requisite number of ropes for the lower lift. By this invention, the strains in question are disposed according to the requirements of each lift, thereby dispensing with the necessity of having a redundant supply of check-ropes, with their accessory mechanism for a higher lift, in order to have the requisite controlling power for a lower lift. This purpose is effected by training the check-ropes over systems of pulleys, by which the single purchase strains of the top lift are developed into double purchase strains in the next lift below; or the strains are similarly developed from lift to lift in whatever is found to be the required ratio.

For instance, the parts C of the rope in fig. 2 apply a controlling strain to the inner lift, which is developed into a double purchase strain for controlling the bottom or outer lift, and which is the result required, inasmuch as both lifts are served with the number of ropes needed for the top lift. In the case of fig. 5, where a double purchase strain is applied to both lifts, the arrangement could be used in combination with that shown in fig. 4, by placing them in alternate positions round the holder, so that each holder is served with a controlling strain according to its requirements.

Preventing the Freezing of Gas in Gas-Mains, and Carburetting Gas.—The Whessoe Foundry Company, Limited, of Darlington; a communication from the Berlin-Anhaltische Maschinenbau-Aktiengesellschaft, of Martinikenfeld, near Berlin. No. 882; Jan. 13, 1896.

This invention relates to the prevention of the condensation of the naphthalene vapour in gas in gas-mains; the apparatus being also applicable for carburetting gas.

To prevent gas from freezing, it is proposed to conduct the vapour of

alcohol—such as potato spirit or spirits of wine—into the mains, the effect of which is "to reduce the freezing-point of the gas so low that, even in the coldest winter, the freezing of the gas, and consequent stoppage of the pipes, will be prevented." For this purpose, a receiver is provided for holding the spirit, and into this the spirit is advantageously introduced by hydraulic pressure. The receiver is connected with the gas supply, so that there is no connection between the interior of the receiver and the atmosphere. Thus loss of spirit by evaporation is avoided. The receiver has arranged in conjunction with it a supplementary receiver, for ensuring uniform pressure of the spirit, and a regulator and scale for controlling the quantity of spirit flowing in a given time from the receiver to a vaporizer in which the evaporation of the spirit is effected, either by means of steam or of direct gas heat; the spirit vapour thence passing into the main, where it mixes with the gas. When steam is used, a condensing vessel is employed in conjunction with the vaporizer; but in the case of direct heating, this is omitted.

The apparatus can, if required, be employed to increase the illuminating power of the gas, in which case the spirit is replaced by the carburetting medium—such as benzol, benzin, or other liquid hydrocarbons of like nature.

Fig. 1.

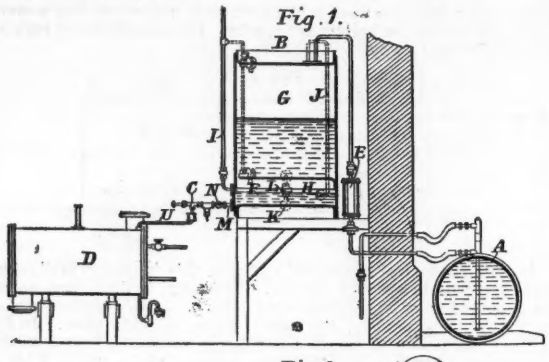


Fig. 2.

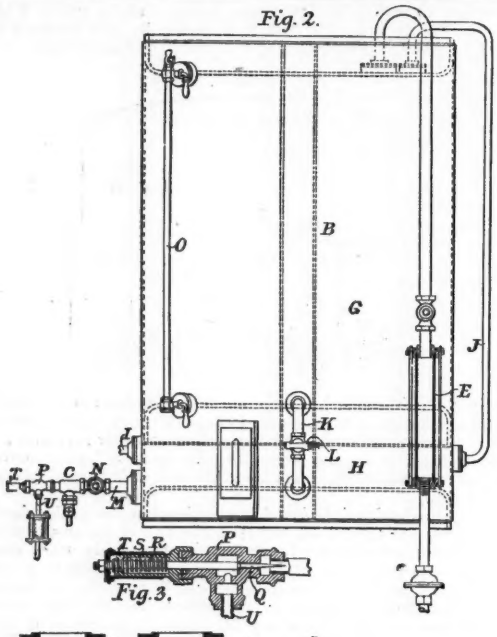


Fig. 3.

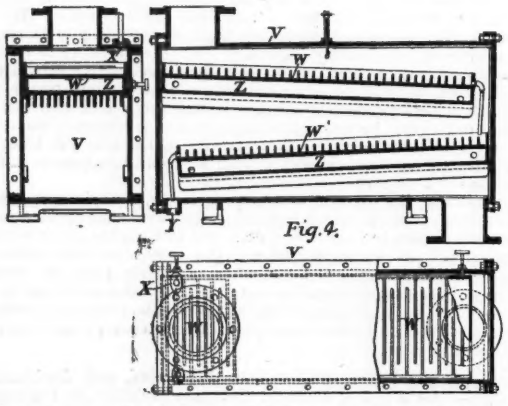


Fig. 4.

Fig. 1 is a sectional elevation of the apparatus; and fig. 2 is an elevation of the receiving vessel for the spirit or carburetting liquid. Fig. 3 is a longitudinal section of the regulator. Fig. 4 is a longitudinal section of the vaporizer; also a transverse section with a part omitted, and sectional plan.

A is the spirit or benzol container; B, the receiving tank or vessel; C, the regulator; and D, the vaporizer. A pipe connects up the container A with the receiver B; and another pipe extends to near the bottom of the container, and connects it with a suitable source of water under pressure—such pipe being fitted with a cock. In the pipe between A and B also is a cock, as well as a transparent gauge. When the two cocks are opened, the water pressure will force the spirit or benzol out of the container A into the receiver B until the spirit is exhausted from the container; and the gauge will indicate when this is the case by the water rising into it. If the receiver is to be filled from a large permanent supply vessel, then the liquid is pumped into the receiver instead of being forced therein by water under pressure. The receiver B is made of a size proportionate to that of the apparatus, so that a constant flow of spirit to the vaporizer D can always be maintained.

In order that the pressure of the spirit flowing to the vaporizer shall remain practically constant, notwithstanding variations in the height of the spirit in the receiver B, it is completely closed, and is provided with a double bottom to form upper and lower chambers G H. The lower chamber is connected by a pipe I, with the gas supply; also the upper and lower chambers of the tank are in communication by pipes J K. The former is connected to the chamber G at the top and to the chamber H at the liquid level; while the latter (which is fitted with a cock L) serves to allow liquid to flow from the chamber G to the chamber H. M is an outlet-pipe (provided with a cock N) from the bottom of the chamber H. When the cocks N and L are opened, the benzol flows from the lower chamber H of the receiver B, under the pressure of the gas entering through the pipe I, until the level of liquid falls sufficiently to uncover the aperture of the pipe J, when gas will pass through the chamber H into the upper chamber G of the tank, and allow the liquid therein to flow through the pipe K from the upper to the lower chamber of the tank, until the liquid rises to such a level that it again closes the pipe J leading to the upper part of the receiver. O is a gauge on the receiver B, which indicates the quantity of liquid in gallons contained in the tank, and also (when the apparatus is used for carburetting gas) the quantity in pounds of benzol of the specific gravity of 0·75 to 0·78; so that the exact quantity of liquid in the receiver can be seen at any time.

By the use of gas for supplying the place of the liquid withdrawn from the tank B, safety from fire is ensured; for, as the benzol throughout its whole course is enclosed, and never comes in contact with the air, no explosive mixture can by any possibility be generated. Also any loss of spirit by evaporation is avoided.

The regulator C consists, as shown in fig. 3, of a valve-casing P, fitted to the pipe M, and provided with a conical regulating plug or pin Q. The rear part of the pin is formed with a screw-thread R, working through a nut or tubular shank S rigidly fixed to the valve-casing P; the end of the screw R being fastened to a sliding cylinder T (or the like) capable of moving outside the tubular shank. The pin Q is screwed more or less inwards—according to the amount of spirit or benzol required—whereby the area of the passage through which the spirit flows is varied; the cylinder T moving backwards or forwards, according to the direction in which the screw is turned over the tubular shank S, which is suitably graduated. The outflow of the benzol can thus be regulated with the greatest nicety.

From the regulator C, the benzol passes through a pipe U, to the vaporizer. This consists of a rectangular case V (preferably of cast iron), fitted with inclined floors or partitions W, which may be ribbed as shown, or undulating. The ribs or undulations are arranged so as to cause the benzol, which enters at X and flows over the partitions, to take a circuitous course through the vaporizer—that is to say, in passing from end to end of the vaporizer, it flows from side to side in zig-zag fashion. Beneath the partitions are chambers Z, through which steam or hot water is passed, so as to cause the evaporation of the benzol; the undersides of the chambers Z being formed with ribs, which afford a large heating surface to the vaporizer. The vaporizer is provided with a gas-inlet at the bottom and a gas-outlet at the top; so that the gas flows through the vaporizer in an opposite direction to the liquid being vaporized, and thus a complete admixture of the vapour with the gas is ensured. The steam or hot water follows the same course as the benzol; so that the cold benzol is met as it enters at X by the hottest steam or water.

The apparatus, when used for carburetting, can be connected with a gas-main in what may be termed a bye-pass, so that more or less of the gas shall be diverted to absorb the benzol in the vaporizer—care being taken to ensure that no excess of benzol is entering the vaporizer. As the pressure or quality of gas varies, the valve must be correspondingly adjusted.

Igniting Arrangements for Gas-Engines.—Shuttleworth, A. & F., and Deed, P., of Lincoln. No. 3503; Feb. 15, 1896.

This gas-engine igniter comprises a chamber, formed at one end with a series of holes through its wall, so arranged that soot or other deposit (such as might otherwise be liable to accumulate) may be blown out by the force of the explosion. In the wall at the same end, there is a hole, in which is fitted a screw-plug, from which project into the igniter chamber any convenient number of pins, wires, or equivalent devices, such as will serve when heated to ignite combustible charges, and will, as the result of the explosion of successive charges, acquire sufficient heat to continue acting as an igniter during the working of the engine. Between the pins and the annular wall of the chamber containing them, is a bad conductor of heat—such as asbestos. The exposed end of the igniter chamber is provided with a perforated cap.

According to one arrangement, the igniter is located within a cavity open at one end to the compression space of the engine, and closed at the other end by a screw-plug, that carries the igniter, and is itself constructed with a spindle, so that it can be passed through a hole in the outer casing and be screwed home. The spindle is tightened outside the casing by a nut adapted to screw upon the correspondingly screwed portion of the outer end of the spindle—a tight joint being made by means of washers.

Incandescent Gas-Burners.—Shaw, E. J., of Walsall, No. 3982; Feb. 21, 1896.

This invention in connection with incandescent gas mantles or hoods is designed to ensure greater durability in their use, and to prevent

injury to them either through vibration, curling and splitting, or contact with the chimney when removing same.

The patentee proposes to construct his shield or protecting device of cylindrical form, open at the top and bottom, and fitting around the burner, and either of sheet metal or a piece of tubing of the requisite diameter. In the sides of the shield, openings are provided for the free passage of air; and the lower edge is furnished with projecting claws to tack on to the support-bars of the burner, so as to engage the openings in the triangle for the purpose of securing the device in position. The shield is arranged to receive and enclose within it the lower edge of the mantle; and it extends downwards around the burner a sufficient distance for its security. Air entering the chimney from below passes freely upwards to the mantles, and circulates in and out through the openings in the sides of the cylinder, "whereby an active and ample supply of air for combustion is ensured, at the same time that adequate protection is afforded to the lower part of the mantle against injury or deterioration." By a modification of the arrangement, the shield is provided interiorly with a perforated metallic ring or gauze flange, arranged immediately below the lower edge of the mantle, for the purpose of protecting its lower portion. The construction in other respects is similar to that already described.

Bunsen Burners.—Wheatley, W. H.; a communication from C. Schmid, of Brussels. No. 5194; March 7, 1896.

The claim for this invention of a burner specially applicable for heating incandescence gas-mantles, is for a bunsen burner in which it is possible to alter the height of the burner orifice by varying the position of the burner-cap on its supporting table.

The burner-cock is surmounted by a tubular bush or plug, screwed into a tube, and terminated by a finely perforated cap-plate, through which the gas issues. The lower and enlarged part of another tube fits loosely on this inner tube; and holes are arranged in them coincidently with each other, for the admission of air to a mixing chamber, so that in one position of the tubes they are open widely, while, by rotating them relatively to each other, the passages are contracted or enlarged to meet requirements. The tubes are secured in any desired relative position by means of a set-screw working in a slot in the outer tube, as will be readily understood. The upper tube is contracted in diameter, and fits loosely in a tube having a flange secured to wings, which carry the gallery and rest on a dished washer, as usual. The upper part of this latter tube is screw-threaded, to receive the correspondingly screw-threaded socket of the burner-cap with its steatite orifice. The object in forming the socket and upper tube separately, and connecting them together by screw-threads, is to admit of the variation of the height of the burner orifice, in order to adapt it to the varying heights of the mantle employed.

Protecting the Mantles of Incandescent Burners when Removing the Chimneys.—Teichmann, L., and Hopkins, E., of Berlin. No. 7397; April 7, 1896.

According to this invention, the mantle is covered by a metallic or other cylinder, which fits inside the glass chimney of the lamp, and is locked on to the lower part of the chimney gallery. The cylinder forms a guide when taking the chimney off, and remains in position over the mantle until the chimney is replaced, when it also forms a guide, preventing contact of the chimney with the mantle.

Incandescent Gas-Burners.—Oehlmann, E. H. C., of Berlin. No. 7438; April 8, 1896.

The patentee's object being "to construct an incandescent gas-burner capable of giving an intense yet steady heating flame," he proposes to provide "the burner with a number of tubes of small diameter, having passages between them for the inlet of air, and provided at their interiors with partitions or obstructions of suitable form, which split up or divide the streams of gas and air passing through the tubes."

APPLICATIONS FOR LETTERS PATENT.

13,736.—Cuinat, H., "Generating apparatus for the production of acetylene or other gas." June 22.

13,750.—Pecenka, A., and Duffek, A., "Appliances for incandescent gas lighting." June 22.

13,761.—Wallace, J. A., "Automatically lighting and extinguishing street and other gas-lamps." June 22.

13,764.—Teed, F. L. and H. W., "Regulating devices for gas-burners." June 22.

13,799.—Morton, J., "The manufacture of tapered gas-retorts." June 23.

13,805.—Kemp, C. W., "Shade-lights, pendants, and other suspended lights." June 23.

13,844.—Brock, J., and Hurter, F., "Recovering sulphur from sulphuretted hydrogen." June 23.

13,847.—Armstrong, J. T., and Orling, A., "Electro-mechanically operated gas lighters and the like." June 23.

13,864.—Audin, H., "Gas or petroleum engines." June 23.

13,885.—Stiens, P., "Burners for gas and other vapours." June 23.

13,941.—Bartlett, F. G., "Burners for incandescent gas lighting." June 24.

13,962.—Jones, F. G., and Brecknell, H., "Gas or oil engine." June 24.

13,977.—Bauweraerts, E., "Gas-supply regulator for the incandescent light." June 24.

14,009.—Fatham, E., "Obtaining light and heat." June 24.

14,151.—Bennett, J. F., and Marples, R. H., "Lighting gas, vapour, and other explosive mixtures." June 26.

14,213.—Peugeot, A., "Air carburettor." June 26.

14,254.—Barr, J., "Automatic valve apparatus for water-pipes." June 27.

14,278.—Ackermann, F. P. J., "The production of acetylene gas." June 27.

14,281.—Denayrouze, M. L., "Incandescent gas-lamps." June 27.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

The Testing of London Gas.

Sir,—Mr. Dibdin's employers have resolved to dismiss (I think unjustly) one of their chief officers on the ground that he has not acted impartially.

In the discussion of Mr. Dibdin's paper at The Gas Institute meeting, Alderman Miles remarked that London gas was the most "thoroughly" (another report says "severely") tested gas in the world, on which Mr. Dibdin made the comment: "Yes, at the stations"—that is, the testing-stations. Did this manifest an impartial spirit? He also said: "In London they had, if called upon, to give one full day's notice to the Gas Companies that they were going to test the gas—mentioning the time—and there must be an hour's interval between the testings (of which there are three); and the Companies were entitled to have a representative present. This was very pleasant for them, because, if the first test came out below the standard, they could telegraph at once; and it might be all right before the next testing." Another and earlier report gives a slightly different account. After the words "going to test the gas," there comes the remark: "So that was a very comfortable position;" and it winds up with: "It was most convenient, he assured them." I do not think these insinuations and innuendoes were—in the absence of representatives of London gas—made in an impartial spirit; but on this point I shall be quite content to leave those who heard it and your readers to be the judges. I must, however, thank Mr. Sugg for his timely protest.

Questions of far greater importance than Mr. Dibdin's impartiality are raised by his remarks. They affect not merely the London Gas Companies, but the entire gas supply of the kingdom, both by companies and corporations. If Mr. Dibdin is right, the Acts of Parliament fixing the illuminating power of the gas to be supplied have been wrongly understood and acted upon. If he is right, the gas supplied throughout the kingdom is from one to two candles lower in quality than it ought to be. But is he right? To this question I will endeavour to give an answer.

I should be sorry to do Mr. Dibdin an injustice; but the implied contention, in his remark "at the stations," seems to me to be that the London Companies should not merely supply 16-candle gas as tested in the manner prescribed by Parliament, by samples taken from the bulk from leading mains (which I heard Mr. Vernon Harcourt say in his evidence in the recent Dublin case was the proper way), but that it should be of that quality—16 candles—tested on the premises of the consumers anywhere and everywhere—say, by Mr. Dibdin's portable photometer. To this contention I join issue absolutely, and say, if that had been the intention of Parliament in prescribing 16-candle gas, Parliament would have said so clearly; and it would have been necessary to fix at least 17½ candles as the standard at the present testing-stations—taking samples of gas from leading mains on its way from the works to the district.

As far back as I can remember, it has been known that gas loses more or less, according to circumstances and temperature, by travelling. The Great Central Company, under Croll's guidance, in the early fifties, recognized the fact, and undertook to supply 12-candle gas, to be tested at the City end of their trunk main, three miles from their works at Bow Common. They did this on the ground that their works were so far off, and not, as was then the case with all the other London Companies, situated in their district of supply. It was necessary that they should supply gas of equal quality with their competitors—the Chartered and City Companies whose works were within the City. Dr. Letheby, the Official Gas Examiner for the Great Central Company's gas, stated, in evidence before the Parliamentary Committee on the Metropolis Gas Bill of 1860, that he found there was a loss of almost exactly two candles in travelling through the three miles of trunk main between the works and the City, of which the greater part was lost in the first 1½ miles. This, no doubt, is the reason why the Act of 1860 prescribes 1000 yards, as near as may be, from the works as the position of the testing-place. This is repeated in the Acts of 1868 and 1869, with the addition of the words "not less than" 1000 yards; but then came the difficulty of Beckton. Objection was made to the 1000 yards limit. In 1876, it was repealed; and the fixing of the positions of the testing-places was left to the Gas Referees. These gentlemen have, as far as possible, or practicable, acted on the principle of the Acts of 1860, 1868, and 1869. They have, in our case at any rate—and I believe, as far as the conditions of Beckton permit, generally have—prescribed a testing-place for each manufacturing station, and have placed it on a leading main as near as may be, but not less than, 1000 yards from the works. I was glad to hear Mr. Harcourt's corroboration of this principle in his evidence in the Dublin case. I therefore contend that London gas is to be of 16-candle power, when tested by samples taken from the bulk from leading mains, in accordance with the intention of Parliament, as carried out in practice by the Gas Referees. If Parliament had intended the quality to be 16 candles at the consumers' burners, it would have said so; and the consumer would have had to pay for it—much more, indeed, than the extra quality was worth.

Mr. Dibdin's remark about the day's notice is grossly misleading and most unfair. He ought to have explained that the Act gives the Companies the right to have a representative present to see that the testing is carried out fairly. *The testers come when they please, at any time either day or night.* If the Companies wish to be represented, they must be informed by the tester at what hour he intends to come, which, in the very few and rare cases in which the Companies consider "shadowing" (as the testers call it) to be necessary, he does from day to day—that is (say) on the Monday he informs the Company's representative at what time he will come on Tuesday, and so on. Sometimes it is 7 o'clock in the morning; and sometimes 11 o'clock at night. It is true Mr. Dibdin said "if called upon," but he did not say why or when the Companies exercised their right. They only do this when they find, by experience, that the tester, in their opinion, does not do his work properly. There have been some testers—very few, I am glad to say—who were incompetent or not impartial, and

who had an evident *animus* against the Company. In these cases, it has been found very necessary to have them watched, with the result that their tests, when so watched, have approximated much more nearly to those made by the Company of the gas as sent out from the works, than when the testers have not been so looked after. I do not charge any of them with dishonesty; but occasionally there has been a tester who seems to have considered it to be his duty, from his point of view, to do his best for his employers, and to make the quality as low as he can. This, as all photometrists know, is quite possible, because light cannot be measured with anything like the exactitude of weight or length. The South Metropolitan Company's gas has been tested since 1870 under the Referees. Probably more than fifty different testers have been employed; and in only two cases has "shadowing" been found necessary. When there is no "shadowing," there is no one to inform the Company if the first or any test is below the mark. The intervals of an hour between the three tests are intended to spread the testing over a longer period; and thus secure a better average of the quality of the day. This was a provision of the original Act of 1868, to protect both Company and consumers.

Mr. Dibdin's remarks on this point, whether he used the somewhat inappropriate words "pleasant" or "comfortable," or "it was most convenient, he assured them" (I think "assure you" is a phrase of his), convey the obvious inference that his object is to trip up the Companies, and not to get gas up to the standard for the consumers. Of course, if an officer of the Company happens to be present at the testings, or if he is informed that the first or any test is low, it is his duty to the Company, and to the advantage of the consumers, that he should immediately report it to head-quarters, in order that the defect may be remedied as soon as possible. Surely it is better for the consumers to have the defect remedied at once, than to have inferior gas throughout the day. It is better for them to have good gas than to have the Company fined for supplying an inferior article. I go farther, and say it is the duty of the tester, and to the advantage of the consumers, that he, on discovering a defect, should immediately inform the Company, in order that they may correct it without delay. The original Act of Parliament says: "A gas examiner shall, at each testing-place, test daily the illuminating power and purity of the gas supplied by the Company; and in the event of the same being ascertained to be defective in either particular, he shall forthwith give notice thereof to the Company." What does "forthwith" mean but immediately the defect is discovered? It certainly does not mean the daily official reports of the tests sent by post the next day to all the parties concerned, because they are provided for in another and separate clause, and arrive 24 hours too late to be of any service.

In conclusion, let me say it is infinitely more to the interest of the Companies to serve the consumers well than it can be to any officials of the London County Council. Mr. Alderman Miles was right—London gas is the most severely tested in the world; and it comes well out of the ordeal, as is evidenced by the quarterly reports of the Chief Gas Examiner, published in your columns. Mr. Dibdin, of course, knows this as well as any man; and it seems to me he should be the last to make such remarks as those referred to in this letter. If he would follow the example of his fair-minded and greatly-respected predecessor—the late Mr. Keates—he would find the Gas Companies ready to work cordially with him for the general good.

GEORGE LIVESEY.

July 3, 1896.

The Estimation of Nitrogen in Coal Gas.

SIR,—The two matters—viz., coal gas analyses showing high percentages of free nitrogen and those not showing any—are distinct; and for that reason I have endeavoured to keep them so. As regards those of the former category, Mr. Pryce does not appear able to say that it would be praticable to so largely dilute coal gas with air as some of the analyses I have quoted, and some of his own, would—if they were representative, and not, as I believe them to be, of exceptional character—show it to be. Nor does he explain how at the same time we can give credit to such analyses as representative, and hold our present views regarding the yields of gas from coal in practice. It must be clear to many of us that it would not be at all practicable to so largely dilute the gas with air as some of these analyses would indicate it to be, when the gas was being severely tested by some authority not appointed by those responsible for its manufacture, and where there was a natural desire to keep down the use of enriching materials; and it is not necessary, I think, to further discuss this matter, upon which there can be little doubt.

The question of coal gas free from free nitrogen, Mr. Pryce has left where it was, since he does not explain how, under such circumstances, the nitrogen in the coal is to be disposed of. I did not overlook the fact that Professor Foster's researches show how a very appreciable quantity from an analytical point of view, and a very large proportion of the total nitrogen in the coal must afterwards be, on distillation, found in the gas in the elementary state. I quoted those researches and my own on the subject of the distribution of the nitrogen on distillation (which latter, by-the-way, were not, as Mr. Pryce says, made in iron retorts but in clay ones), in order that the matter should not be overlooked by either of us.

The following are the published results of all the comprehensive studies of the question with which I am acquainted; and they are, I believe, sufficiently unanimous on this point, though independent, and conducted on independent lines:—

Professor Foster (1884).—Laboratory distillation of the coal in small iron and glass tubes. Believes that from 21 to 36 per cent. of the total nitrogen originally in the coal must be in the gas as free nitrogen.

Schilling (1886).—Clay retorts. Boldon gas coal. 19·2 per cent. of the coal nitrogen (with the exception of the trifling quantities as cyanogen and in the tar) believed to be in the gas as free nitrogen.

Lewis T. Wright (1886–1887).—Lectures at the Central Technical Institute. Clay retorts, as in actual working practice. Derbyshire Silkstone coal at a temperature producing 11,187 cubic feet per ton. 53·4 per cent. of the coal nitrogen found in the gas in the free state. The same coal distilled at a lower temperature to yield 7500 cubic feet per ton; 21 per cent. of the nitrogen found in the free state in the gas.

Knublauch (1884–1895) assigns 30 per cent. of the coal nitrogen to the free nitrogen in the gas.

It will be seen that this work is unanimous in allocating a very important part of the nitrogen in coal on distillation to free nitrogen in the gas. It covers, I believe, a sufficient range of conditions—containing vessels, coal, temperature, &c.—to include conditions likely to occur in practice. I wish to point out that it assigns a very important part of the nitrogen originally in the coal precisely to the form that Mr. Pryce says that, in some cases of coal distilled at high temperatures, it does not take. If, then, his experiences are not of a very unusual and exceptional character—and it is not possible to say that those I have quoted are of such character, since they cover actual practical conditions—it would appear that the investigators I refer to have allowed to escape their observation in some cases more than half the nitrogen originally in the coal; and this should be accounted for somewhere on the analysis of the various distillation products.

It is not beyond the bounds of possibility (though at present it does not seem probable) that four independent workers on this subject have wrongly distributed the coal nitrogen on distillation; and it may be that Mr. Pryce's experiences are nearer the truth. But even admitting this possibility, I do not think it unreasonable to ask for collateral evidence, in the shape of some evidence showing how in his case the nitrogen in the coal is disposed of on distillation. I have shown that the material of the containing vessel, coal, and temperature will not explain the matter from his point of view; and a moment's consideration will show those acquainted with the subject that the formation of more or less cyanogen does not help it, for two reasons: Firstly, that the maximum cyanogen found would have to be multiplied from twenty to forty fold to account for the nitrogen that will be missing if Mr. Pryce's views are accepted as being other than unusual; and, secondly, because, if the nitrogen hitherto believed to be free in the gas had taken the form of cyanogen, it would have been estimated, and not have been missing.

LEWIS T. WRIGHT.

1, *Victoria Street, S.W., July* 3, 1896.

The Dublin Corporation and the Gas Company.

SIR,—The Dublin Corporation Gas Bill has been rejected by the House of Lords Committee; but I trust that out of it there may yet come good, as the cause of the dispute, and the evidence produced, so far as the photometer is concerned, revealed a condition of things unrivalled in the history of photometry. Still more so, if the suggestion that was made by Mr. Gordon, Q.C. (in my cross-examination), is true—namely, that the instrument in use in Dublin for testing the illuminating power of coal gas was constructed in accordance with the instructions of the Arbitrators. This, however, I absolutely refuse to believe until I am so informed by those gentlemen.

Whether or no such is the case, I do not wish to discuss; but I do say emphatically that it is high time that the proper authorities, whoever they may be, make up their minds as to what is a fair photometer, and define it in such a manner that there can be no possibility of misunderstanding. So long as there exist so many different forms of photometers, so long will disagreements prevail, and photometry remain what it is in so many places—viz., a perfect farce. Surely there can be no difficulty in defining and adopting a photometer that can be universally accepted. Expense cannot be raised as an objection, as it has been proved beyond all doubt that the simpler the instrument and the more the cabinet-makers' art is dispensed with, the more constant and reliable are the results obtained.

That Evans photometers are anywhere tolerated, is past all understanding; since they have again and again been proved to be utterly unsuited for the accurate testing of the illuminating power of gas. The fact that they can be so mechanically altered as to raise or lower the apparent value of the illuminating power of the gas, renders their use as photometers absolutely valueless. The possession by a gas examiner of a photometer that gives at its best but erratic results, is a continual source of worry and dissatisfaction; and it must be equally irritating to the engineer responsible for the illuminating power of the gas being up to the required standard.

It is my opinion—based on a good many years' experience as a gas examiner—that much of the friction that now exists between gas companies and county councils, corporations, vestries, &c., will be greatly diminished when testing-stations become properly ventilated, and photometers are provided capable of giving accurate results.

Under these conditions, even with the present standard of candles, testing-stations should be considered (what I have always been of opinion they should be) an assistance to the gas company in maintaining the gas up to the prescribed standard, and not what many evidently now consider them to be—places where every effort is made to catch the companies tripping.

ALFRED FERRIS DAMON,
Gas Examiner to the London County Council.

Ladbroke Grove, Notting Hill, W., July 2, 1896.

[Our report does not mention such a suggestion as that attributed to Counsel by our correspondent, and we fail to appreciate the reason for his making the assertion.—ED. J.G.L.]

The Registration of Water-Meters.

SIR,—In the "JOURNAL" for April 7 last, there was a paragraph commenting upon a letter sent by Messrs. Churchman, of Ipswich, to their local paper, in which they questioned the registration of a meter fixed by the Ipswich Corporation on the supply to their premises; the writers implying that the meter had been over-registering, and consequently that they had been over-charged. My attention was called to this letter; and as I have, during the last four years, supplied about 400 of my positive meters to the Ipswich Corporation, partly in substitution of inferential meters previously fixed there, I inquired of the Engineer whether the meter about which complaint was made was one of mine. Finding this to be one I sent about three years ago, I

asked that it should be tested both at Ipswich and at my works. This has now been done, with the result that, so far from the meter over-registering, it is found to be slightly in favour of the consumer. I should also like to point out that, the meter being positive in its action, it cannot over-register, provided it is correct when first made; and no meter is passed, either by me or by the corporation purchasing it, unless such be the case. To do so, it would have to run faster than the water which drives it—a physical impossibility.

The quarterly readings complained of by Messrs. Churchman were as follows: March 28 to June 27, 56,332 gallons; June 28 to Sept. 28, 57,950 gallons; Sept. 28 to Dec. 20, 49,550 gallons; Dec. 20 to March 22, 41,680 gallons; March 22 to June 27, 40,370 gallons; June 27 to Sept. 24, 65,340 gallons; Sept. 24 to Dec. 19, 202,660 gallons; Dec. 19 to March 19, 73,210 gallons. The agreement included a minimum of 44,000 gallons per quarter; and it appears that when the second quarter's consumption came to the knowledge of the Engineer, he called Messrs. Churchman's attention to the increase. Then the consumption shows a reduction, evidently due to attention being given to economizing the use of the water. During the autumn, the consumption increased; and it is certain something abnormal—either leakage or waste—was going on.

It is the old story—leakage or waste registered by the meter, and the meter being blamed. But this is an instance of the meter serving the very purpose for which it is put in—namely, either to check waste or make the consumer pay for it.

High Holborn, W.C., June 30, 1896. GEO. KENT.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Bills last week:—

Bills brought from the Commons, read the first time, and referred to the Examiners: Bilston Improvement Bill, Kilmarnock Corporation Water Bill.

Bills read a second time and committed: Burton-upon-Trent Corporation Bill, Kelty Water Provisional Order Bill.

Bill reported: Kelty Water Provisional Order Bill.

Bills reported, with amendments: Burton-upon-Trent Corporation Bill, London Sea Water Supply Bill, Sheffield Corporation Water Bill, Yeovil Corporation Water Bill.

Bills read the third time and passed: Brighton Corporation Bill, Gas Provisional Orders Bill, Gas and Water Provisional Orders Bill, Huddersfield Water Bill, Kirkcaldy and Dysart Water Bill, Lanarkshire (Middle Ward District) Water Bill, Leamington Corporation Bill, Local Government Provisional Orders (Gas) Bill, Portsmouth Borough Water Bill.

Bills Royal Assented: Barnsley Corporation Water Bill, Bexhill Water and Gas Bill, Birmingham Corporation Water Bill, Bonnybridge, &c., Water Provisional Order Bill, British Gaslight Company (Norwich) Bill, Chelsea Water Bill, Colwyn Bay and District Gas Bill, Cowes Gas Bill, Falkirk and District Water Bill, Gas Provisional Orders Bill, Huddersfield Water Bill, Lambeth Water Bill, Lanarkshire (Middle Ward) Water Bill, Malvern Link Gas Bill, Manchester Corporation Bill, Padiham Urban District Council Water Bill, Ystradyfodwg Urban District Council Gas and Water Bill.

HOUSE OF COMMONS.

Friday, July 3.

EAST SURREY WATER BILL.

On the order for the third reading of this Bill,

Mr. CUBITT moved its rejection. Having explained to the House that the object of the measure was to empower the East Surrey Water Company to buy up the undertaking of the Reigate Water Company, he said the Corporation of Reigate were opposed to the Bill being passed, because they were naturally desirous of keeping the control of their own water supply. Formal notice was not given to the Corporation until just before the second reading; and consequently there was not sufficient time to enable them to oppose the Bill at that stage and in Committee. He was aware that he was taking an unusual course; but nevertheless, for the reasons given, he must move the rejection of the Bill.

Mr. BONSOR regarded the course taken by his hon. friend as absolutely unprecedented. This opposition was raised by a small clique in Reigate. The borough of Reigate covered an area of about 6000 acres. The old town, from which the petition emanated, covered 435 acres out of that area. The population affected by the Bill was 4000 out of a population of 22,000 in the borough; and the rateable proportion affected was £23,000 out of a gross amount of £140,000 a year. His friend alleged that the Corporation had not had a fair chance of opposing the Bill. But he (Mr. Bonsor) had in his hand a report showing that the Bill was discussed by the Highways Committee in April, and that by a large majority they refused to oppose it. This was really a question of a local quarrel; and Parliament was now asked to step in and endeavour to settle it. There was nothing to prevent the Reigate Town Council, if they pleased, from coming to Parliament next year with a Bill to acquire the control of their own water supply; but he did not think it was justifiable to ask the House to throw out a Bill which had been passed by Committees of both Houses, and which was now in its final stage.

Mr. BURNS supported the motion. He pointed out that the hon. member for Reigate (Mr. Cubitt) had originally backed this Bill; and the fact that three months afterwards he should not only have abandoned this position, but should be moving its rejection, was sufficient to induce the House to listen to the appeal of the district. He denied that this opposition was being promoted by a clique. As a matter of fact, a public meeting, attended by between 400 and 500 people, was held at Reigate to consider the question; and only about 20 persons (many of them shareholders in the Company) voted in favour of the Bill being proceeded with. He contended that the House ought not to allow a Bill to pass that had as the chief argument against it the fact that the Town Clerk of Reigate and the Chairman of the Finance Committee of the Corporation were interested in the Water Companies concerned.

Mr. J. W. LOWTHER remarked that it had been said that this was an unprecedented motion. But even if it was unprecedented, if good cause could be shown in support of it, there was no reason why the House should not accept it. If it could be proved that the Bill had in any way been smuggled through the House, there would be ample justification for rejecting it on the third reading. This led them to consider whether the Bill had in any way been smuggled through the House. The notices which the Standing Orders required had been duly given; and it seemed to him that the matter had really been before the citizens and the Town Council of Reigate without their taking any action. From the 7th of December last year onwards, he found in the local papers reports of meetings at which the whole question was discussed. Even if they assumed that the citizens of Reigate had overlooked every one of these reports, it was to be remembered that the Bill went before the House of Lords, that it was an opposed Bill in that House, and that some account of the proceedings there would have appeared in the local Press. Up to the time, therefore, that the Bill left the House of Lords, he could not but think that the matter was before the Reigate Town Council. At that time, at all events, they had an opportunity of petitioning the House of Commons. They did not avail themselves of that opportunity; and it was not until a few days before the second reading that they seemed to have taken any definite action in opposition to the Bill. On the other hand, it was admitted that the Highways Committee of the Council were fully informed on the matter, knew perfectly well what was going on, and discussed it. The Council rejected by 14 votes to 6 a motion that the Bill should be opposed. ("Why?") He did not know why they rejected it. He was not in the secrets of the Council.

Mr. BURNS asked if the right hon. gentleman was aware that the Town Clerk advised them that they could not proceed, because, under the Borough Funds Act, they could not vote the money later on.

Mr. LOWTHER said he was not responsible for the advice given to the Council by the Town Clerk, nor were the East Surrey Water Company; and if the Town Clerk had been guilty of some form of *laches* in not having advised the Council rightly, why should the Company suffer, when they had complied with all the regulations of the House? It was not his business to enter into the merits of the Bill. It was only his duty to say whether or not the forms of the House had been properly complied with. In his opinion, they had not only been properly, but amply, complied with; and the Company would be hardly dealt with if the House were to reject the Bill.

Mr. LABOUCHERE contended that the interests of the inhabitants of Reigate should be considered before those of the Water Company. As to the action of the hon. member for Reigate, the Corporation and he were of the same opinion—that the Bill should not be further proceeded with. When the House knew the opinion of the majority of the people of Reigate, and considered the fact that they were unable to appear before the Select Committee, although they thought they had a fair case, they ought to throw out the Bill, and let it be brought in again if desired.

Sir W. HARCOURT said he had made it a rule never to interfere in matters relating to Private Bills; but there were exceptions to this rule when it affected the procedure of Parliament. The question was whether this matter had been fairly dealt with; and the test of that was whether the parties entitled to be heard had been heard. It was quite plain that they had not. To pass a Bill under these circumstances would be very unsafe. It did not follow, because the East Surrey Water Company had done all that was necessary, that the House should pass a Bill on which the inhabitants of Reigate had not had an opportunity of being heard. When the resolution relating to the matter came before the Town Council on April 27, it was found to be out of order, because the provisions of the Borough Funds Act as to obtaining consent of the ratepayers had not been complied with. It would be an unfortunate precedent if, in circumstances such as these, a Bill should be passed seriously affecting the interests of a community, and contrary to the opinion of its municipal representatives.

Mr. HALSEY reminded the House that the Standing Orders Committee were appointed to relieve persons promoting or opposing Bills from any accidental omission to comply with the Orders. The Committee simply considered whether those who applied to have the Standing Orders suspended had made out a satisfactory case. In the present instance, there was a full meeting of the Committee; and after going carefully into the matter, they came unanimously to the conclusion that a case had not been made out for suspension.

Mr. J. ELLIS, as a member of the Standing Orders Committee, confirmed what had been said by the Chairman of the Committee (Mr. Halsey). The issue the Committee had to decide upon was very narrow. It was whether the Town Council of Reigate were fully informed of the circumstances of the Bill in ample time to have allowed them to present a petition in the ordinary course. The Committee were fully satisfied that they had had such an opportunity, and that, therefore, it did not lie with them to suspend the Standing Orders.

The House then divided, with the following result: For the third reading, 175; against, 77—majority, 98. The Bill was accordingly read the third time.

The following progress was made with Bills last week:—

Bills read a second time and committed: Aldershot Gas and Water Bill, Culter Water Order Confirmation Bill.

Bills reported: Chester Corporation Bill [preamble not proved], East Surrey Water Bill, Staines Reservoirs Bill.

Bills read the third time and passed: Bilston Improvement Bill, East Surrey Water Bill, Kilmarnock Corporation Water Bill, Malvern Link Bill, Newcastle-upon-Tyne and Gateshead Gas Bill, Ystradyfodwg Urban District Council Gas and Water Bill.

The Blackrock Commissioners and others have petitioned against

the Dublin Corporation Bill; and the Alliance and Dublin Consumers' Gas Company have asked to be heard against alterations in the Bill.

The Water Provisional Orders Bill was referred to a Select Committee, consisting of Lord Connemara (Chairman), the Earl of Abingdon, Lord Boston, Lord Carysfort, and Lord Granard.

The Edinburgh Extension Bill was referred to a Select Committee, consisting of the Earl of Strafford (Chairman), the Duke of Marlborough, Lord Rowton, Lord Burton, and Lord Heneage.

HOUSE OF COMMONS COMMITTEE ON THE LONDON WATER BILLS.

Wednesday, July 1.

(*Before Sir* J. Pease, *Chairman; Sir* J. Brunner, *Mr.* Baldwin, *Mr.* Bond, *Mr.* J. Stuart, *Mr.* Brigg, *Mr.* Fry, *Mr.* Lees Knowles, *and Mr.* Muntz.)

To-day the Committee proceeded to consider the clauses of the

STAINES RESERVOIRS BILL.

The Chairman said they would first go through the alterations in the preamble, and then postpone it.

Mr. Rees (the Parliamentary Agent for the promoters) said the suggestion of the Committee was that they saw no necessity to retain the four first paragraphs of the preamble; and these had accordingly been omitted, as well as the following: "And whereas the main reservoirs by this Act authorized would, in fact, form an instalment of the storage scheme submitted to the Commissioners as aforesaid, and will be capable of storing water sufficient for all possible needs of the inhabitants within the districts of the three Companies for many years to come." With regard to Auditors, clause 17 had been altered so that it read thus—

(1) There shall be one or more Auditor or Auditors of the accounts of the Joint Committee on behalf of the three Companies, as the Directors of the three Companies may agree; and if the Directors of the three Companies do not agree as aforesaid, there shall be three Auditors of the accounts of the Joint Committee, one for each Company, to be nominated by the Directors of the respective Company under the hand of the Chairman of Directors of that Company. (2) The Auditors shall hold office for one year. (3) The provisions of this Act with respect to the nomination, holding of, and ceasing to hold office, retirement, nomination, and resignation of members of the Joint Committee shall apply, *mutatis mutandis*, to and in the case of Auditors: Provided that an Auditor need not be a Director of any of the three Companies.

The Committee having ratified the omission of the clauses of the preamble and the alteration of clause 17, and also having made verbal alterations in clause 18 (relating to the remuneration of the Joint Committee), new clauses providing for the audit of the accounts and for the protection of the lands of Mrs. Alice Jenkins were agreed to.

A section was proposed for the protection of the South-West Suburban Water Company; but its consideration was postponed.

Mr. Fitzgerald, as representing the Thames Conservators, handed in a number of new clauses and amendments.

Mr. Littler objected to these being proceeded with, on the ground of insufficient notice; and their consideration was deferred.

A long section was inserted for the protection of the Staines and West Drayton and Great Western Railway Companies; and a proviso was added to clause 39 to the effect that the works authorized should be commenced as soon as practicable after the passing of the Bill and be prosecuted and completed with all due diligence.

Mr. Rees then proposed the following addition to clause 42:—

Nor shall the Joint Committee, by means of the said intake, take from the River Thames any greater quantity of water than one hundred millions of gallons in any one day, nor shall there be delivered to the three Companies quantities of water amounting in the whole to more than thirty-five millions of gallons in any one day, except in case of emergency or in anticipation of probable emergency, in either of which cases there may, with the consent of the Local Government Board, be delivered to the three Companies quantities of water not exceeding in the whole, upon the average of one month, forty-five millions of gallons per diem; and such increased quantities may be delivered during such period, but only during such period as the Local Government Board may from time to time prescribe: Provided always that if the Thames Conservancy Board at any time construct across the River Thames at Penton Hook a weir (hereinafter referred to as the "Penton Hook Weir") the proviso first contained in this section shall be read and have effect as if the words "Penton Hook Weir" were substituted for the words "Bell Weir," and the words "three hundred million gallons" were substituted for the words "two hundred and sixty-five million gallons," provided also that the Joint Committee shall not collect, divert, impound, or take the waters of the River Thames at such time in such manner, or to such extent, as to prejudice the right of the East London Water-Works Company (hereinafter called "the East London Company") under the East London Water (Thames Supply) Act, 1867, to take, or so as to prevent the East London Company from taking water from the River Thames as in the last-mentioned Act provided.

A long discussion took place among the representatives of the parties and the Committee as to the drafting of the proposed section; and finally it was altered so as to give protection to the Wraysbury Brook as well as the Thames, and in the direction of leaving out the words referring to the "anticipation of a probable emergency." An amendment was also inserted, at the suggestion of the Committee, requiring a copy of the notice of application made to the Local Government Board to be forthwith sent to the Thames Conservators.

Mr. Fitzgerald complained of the wording of the clause—holding it to be too general. He brought forward a further proviso to the effect that no deviations should be made from the aqueducts and conduits shown on the plans without consent of the Thames Conservators.

Objection was taken to the proposed proviso; and after some argument, the matter was postponed.

The following (42 A) was proposed:—

Nothing in this Act shall be deemed to confer upon the Joint Committee any priority of right to take water from the River Thames, as against any company, body, or person already, or who may hereafter be, empowered by statute to take water from the river.

This clause was postponed, together with a number of others providing for the keeping of the main reservoirs full, saving the rights of the Lambeth and Southwark and Vauxhall Water Companies, and dealing with the abstraction of water from the Thames generally.

The following proviso was agreed to:—

Provided always that, if and whenever the total quantity of water in the reservoirs No. 1 and No. 1A by this Act authorized shall fall below seven hundred million gallons, the three Companies respectively shall not be entitled to have delivered to them, out of the proportion for the time being of the respective Company of the stored water, a larger quantity of water in any day than shall be determined by the Joint Committee with the assent of two-thirds at least of the members of the Joint Committee representing each of the three Companies, or as, in the absence of such assent, shall be determined by the Standing Arbitrator to be reasonable, having regard to the other provisions of this part of this Act.

Mr. Rees then brought forward two new clauses dealing with the rate of interest on debenture stock, and providing for the redemption of the stock at par after a certain period.

On behalf of the City of London, an alternative proposal was made to require the three Companies who were parties to the Bill to raise £333,000 each separately; but the Committee decided that the money should be raised by the Joint Committee as though they were a separate Company.

The promoters then brought up the new sinking fund clause (51A), as follows:—

(1) Each of the three Companies shall, at the end of the half year current when the respective Company first uses any part of the stored water, and at the end of each succeeding year, carry to a sinking fund such percentage on one-third part of the amount of debenture stock so issued, and of any premiums received thereon, as shall be equal to the excess of the average percentage of the dividend or interest paid for that half year or year on all the capital of that Company, whether stock or share capital—including in the case of the New River the capital sum of one million five hundred and nineteen thousand nine hundred and fifty-eight pounds mentioned in section 4 of the New River Company's Act 1852—or debenture stock, including one-third part of the debenture stock for the time being issued under the powers of this Act as aforesaid, with any premiums received thereon respectively (which part of such debenture stock and of the premiums received thereon shall for this purpose be deemed to be part of the capital of, or, as the case may be, to have been received by, the respective Company) above the rate of interest at which the debenture stock under this Act was issued, together with an additional one per centum per annum added thereto for management; such sinking fund to be held and applied by the Chamberlain of the City of London as trustee for the purpose of purchasing and holding shares or stock of the respective Company and of investing the dividends thereon with a view to ultimately extinguishing the capital of the respective Company, or for such other purposes as Parliament may from time to time determine. No shares or stock so purchased and held shall confer any right of voting at any meeting of the respective Company. Provided that, in the event of any debenture stock created under this Act being issued below par, the percentage to be carried to the sinking fund shall, in respect of such debenture stock so issued below par, be calculated on the amount of money raised by such debenture stock instead of on the nominal amount of such debenture stock. For the purposes of the above provision in the case of the New River Company, any sums paid by way of dividend or interest out of income derived from freehold or leasehold estate or property shall not be reckoned, included, or taken into account.

(2) In the event of the undertaking of the respective Company being acquired by a public authority, the above-mentioned allowance of one per centum for management shall not be deemed to have increased the capital value of the undertaking of the respective Company, or be the subject of compensation or purchase.

This clause was discussed at some length; and eventually it was altered at the beginning, on the suggestion of Mr. Lees Knowles (a member of the Committee), so as to read, "shall at the end of the half year current in which water is first obtained by means of the works by this Act authorized."

Mr. Rees then submitted the following new clause (53A):—

If the undertaking of any of the three Companies be purchased within seven years from the passing of this Act (otherwise than by agreement) by any public body or trustees, no additional or diminished money value shall be deemed to attach to the undertaking by reason of the provisions contained in this Act.

The Chairman said the Committee did not approve of the wording of the clause. They desired that, in the event of the sale of the undertaking, the three Companies should not bring in, as an increase of the value, the water supply which was being obtained from the Staines reservoirs.

Mr. Littler urged that the Company should not be damnified for works they were undertaking solely for the benefit of the public.

The Chairman said the Committee objected to complicating the Bill to meet a contingency never likely to arise. They desired to follow the lines of the Southwark and Vauxhall clause.

Mr. Rees pointed out that the clause had been put in the Southwark and Vauxhall Bill as a punishment to that Company.

The room was cleared, and the Committee spent some time in private deliberation. On the re-admission of the public,

The Chairman said the clause the Committee had decided upon was as follows:—

If the undertaking of any of the three Companies be purchased within seven years from the passing of this Act (otherwise than by agreement) by any public body or trustees, nothing in this Act contained shall extend, or be deemed or construed to extend, to the Company power to bring into account, or to make any claim in respect of, any advantage conferred on them by, or resulting from the passing of, this Act.

Mr. Worsley Taylor complained of two sub-sections of clause 44 dealing with the question of relinquishment. He said he took exception to clause 45 of the Bill altogether, which would give any of the three Companies power by notice to relinquish part of their stored water. He held that the clause was contrary to the preamble of the Bill, and that if it were inserted it would be sanctioning the rights in the Bill for generations.

The Chairman: Do you propose that the three Companies should each have a stipulated one-third of this stored water and no more?

Mr. Worsley Taylor replied in the affirmative. He said the Companies should not be allowed to sell water to other Companies, but should use it legitimately.

Counsel for the Hertfordshire and Middlesex County Councils supported Mr. Taylor's objection.

Mr. LITTLER having argued in defence of the clause,

Mr. STUART asked if the promoters would undertake that, when one Company was getting more than one-third of the water, that Company should undertake not to sell water to other London Companies.

Mr. LITTLER: Without hesitation.

Lord R. CECIL said that would meet his objection.

A clause was submitted to the effect that none of the three Companies should, during any period of relinquishment, sell any water to any of the other Companies supplying water in London.

Mr. WORSLEY TAYLOR said that "relinquishment" would give two Companies power to hand over their water to the third Company, in which event that Company would have water not for the ten years, but for an unlimited period.

The Committee decided that the proposed clause should stand, and that there should be no restriction on the Companies dealing *inter se* with water.

Mr. REES drew attention to clause 46, which specifies that the Joint Committee shall provide and keep suitable gauges for measuring and recording the quantity of stored water taken by, or delivered to, each of the three Companies. He said that after the word gauges, at the beginning of the clause, it was proposed to insert the words "for indicating when the quantity of seven hundred million gallons hereinbefore referred to is contained in the reservoirs No. 1 and No. 1A by this Act authorized and also" for measuring, &c.

The amendment was agreed to.

Thursday, July 2.

The consideration of the clauses was proceeded with this morning.

Mr. FREEMAN said he desired to draw attention to a matter which had been alluded to on the previous day, when a desire had been expressed by Sir J. Brunner that the Water Examiner should have a right to certain information. He (Mr. Freeman) had accordingly prepared a clause to give the Examiner the right to see the water-gauges and so forth.

Mr. PEMBER objected to the clause; and its consideration was postponed.

The CHAIRMAN: We will now take the auction clauses.

The following clauses (48C to 48G) were agreed to:—

The Joint Committee shall, when any stock created under the powers of this Act is to be issued, offer the same subject to the power of redemption conferred by the last preceding section of this Act for sale by public auction or by tender in such manner, at such times, and subject to such conditions of sale, as the Joint Committee shall from time to time determine: Provided that at any such sale by auction no single lot shall comprise more than one hundred pounds nominal value of such stock, and that the Joint Committee shall at any such sale by auction or by tender fix the reserve price to be put upon such stock. Notice of the amount of such reserved price shall be sent by the Joint Committee in a sealed letter to the Board of Trade not less than twenty-four hours before the day of auction or the last day for the reception of tenders as the case may be; and such letter may be opened after such day of auction or last day for the reception of tenders, and not sooner.

It shall be one of the conditions of any sale of stock under this Act that the whole nominal amount thereof, together with any premiums given by any purchaser at such sale, shall be paid to the Joint Committee within three months after such sale.

The intention to sell any such stock by auction or by tender shall be communicated in writing to the Clerks of the London County Council, the Surrey County Council, the Middlesex County Council, and the Bucks County Council, to the Town Clerk of the City of London, and to the Secretary of the Committee of the London Stock Exchange, at least twenty-eight days before the day of auction or the last day for the reception of tenders as the case may be; and notice of such intention shall be duly advertised four times during such period in two or more London daily newspapers and one newspaper published in each of the counties of Surrey, Middlesex, and Bucks.

When any stock created under the powers of this Act has been offered for sale by auction or tender and not sold, the same shall again be offered for sale by public auction or by tender in the manner and subject to the provisions of this Act with respect to the sale of stock when and as the Joint Committee think fit.

It shall not be lawful for the Joint Committee to create and issue any greater nominal amount of stock under the powers of this Act than will be sufficient to produce, including any premiums which may be obtained on the sale thereof, the total amount of one million pounds; but in the event of such stock being issued at less than par value, and resulting in a deficiency in the nominal amount hereby authorized to be raised, the Joint Committee may issue such additional amount of debenture stock as shall make good the deficiency so resulting.

The Committee then proceeded to discuss the clauses brought up on behalf of the Thames Conservators.

Mr. FITZGERALD proposed a clause (41A) of which this was the first sub-section: "For the protection of the Conservators, the following provisions shall have effect (that is to say): (1) The aqueducts or conduits No. 1, No. 6, No. 7, and No. 8 by this Act authorized, and all or any temporary or permanent works connected therewith, so far as the same affect the River Thames, the Colne Brook, and the Wraysbury River, all of which are in this section included in the expression 'the River Thames,' shall, if constructed, be executed according to plans, elevations, and sections to be approved in writing by the Conservators, and deposited at their office; and the works in the River Thames shall be executed in accordance with such plans, elevations, and sections, to the reasonable satisfaction of the Engineer for the time being of the Conservators; and the traffic of the River shall not be interfered with more than may be absolutely necessary in the construction of such aqueducts and works." This, he said, was the ordinary clause adopted in all Bills affecting works being carried out on the Thames. It was a stereotyped clause.

Mr. BAGGALLAY said that if the Conservators would consent to insert words to the effect that, in the event of a difference between the Engineer of the Conservators, and the Engineer of the Joint Committee, the matter should be referred to arbitration, he would not object to the clause. Otherwise the Companies would object to being ruled by the arbitrary decision of the Engineer to the Conservators.

The CHAIRMAN said the works must have the consent of the Conservators at common law. In the case of rivers in the North of England, he knew that there was no appeal except to the Conservators. The plans must be approved of by them in the first instance.

Sir R. WYATT put in several Acts of Parliament to show that this was a stereotyped form of clause.

The sub-section was amended by omitting the names of the Colne Brook and the Wraysbury River, and inserting, after the word "Thames," "and any tributary thereof."

The following sub-section was agreed to: "The Joint Committee shall, within 28 days after completion of the works hereinbefore mentioned, so far as the same affect the River Thames, and after notice from the Conservators so to do, remove any temporary works and materials for temporary works which may have been placed in the River Thames by or at the instance of the Joint Committee. On their failing so to do, the Conservators may remove the same, charging the Joint Committee with the expense of so doing; and the Joint Committee shall forthwith repay to the Conservators all expenses incurred."

Sub-section 3 was omitted from the new clause; and provision was made that the Joint Committee shall not make or commence any work on the shore, bed, or banks of the River Thames until the plans, elevations, and sections referred to in sub-section 1 had been approved by the Conservators. New clauses dealing with the provision of lights, &c., during the construction of the river works, and interference with the soil or bed of the river, were also added.

Mr. FITZGERALD submitted a long rider to clause 42; but it was not accepted.

Clause 42A was amended by the addition of the words "or any tributary thereof" after the word "Thames."

Mr. FITZGERALD brought up a clause as to ascertaining the quantities of water drawn from the Thames. He said that, in substance, it was taken from the Thames Conservancy Act, 1894. By the section the existing water supply of all the Companies who took water from the Thames was measured.

Mr. BAGGALLAY objected to the Thames Conservators having power to deal with the question of the amount of water delivered from the reservoirs. He did not object to their measuring the water at the intake from the Thames.

Mr. FITZGERALD held that it was necessary to measure the water going down the aqueduct; otherwise the mere recording of the quantity taken from the Thames would be illusory.

The CHAIRMAN thought the first check—at the intake—would be sufficient.

Mr. FITZGERALD: Your conditions are that the aqueduct shall not deliver more than 35 million gallons a day.

Mr. STUART: Someone will have to check them; but are you the proper persons?

Mr. FITZGERALD submitted that they were.

The CHAIRMAN (to Mr. Baggallay): At any rate, there cannot be much harm in giving them this power.

Mr. BAGGALLAY said he objected to the Thames Conservators being imported into a position which was outside their functions. The Conservators were interested in the water taken from the Thames, but not with what was done with the water after it left the river.

After some discussion,

Mr. BAGGALLAY consented to withdraw his opposition to the clause if the Conservators would consent to amend it; and ultimately this was agreed to.

Mr. FITZGERALD then proposed the following clauses (42E):—

The water to be taken by the Joint Committee under this Act shall be used by the three Companies, or some or one of them, for the supply of their respective districts only, and shall not be supplied to any other of the Metropolitan Water Companies, or to any other company, body, or person outside their said respective districts; and whenever and so long as any water which the West Middlesex Company or the Grand Junction Company are now authorized to take from the Thames or any tributary thereof, is being supplied to any other of the Metropolitan Water Companies under the powers of the Thames Conservancy Act, 1894, or otherwise, the maximum amount which the Joint Committee may under this Act deliver to the three Companies shall be reduced by the amount so being supplied by the West Middlesex and Grand Junction Companies, or either of them, to any other of the Metropolitan Water Companies.

He said he desired to omit the latter part of the clause, and stop at the word "districts."

Mr. BAGGALLAY said that if the clause ended at the word "districts," he should have no objection to the principle of the proposal.

The clause was then agreed to, with the amendment indicated.

Another new clause (42F) was then submitted, providing that, notwithstanding anything in the Act, or the Acts incorporated therewith, the Joint Committee should not take any waters in, under, or on the lands authorized to be acquired by them under the Act.

Mr. BAGGALLAY objected to the clause, on the ground that it would prevent the promoters sinking small wells on their land for the supply of their workmen.

Mr. FITZGERALD said the promoters had declared that they did not intend to take water from wells for the purpose of sale; and therefore he could not see why they objected to this.

Lord R. CECIL supported the clause.

Mr. BAGGALLAY said the proposal was a new departure in water-works legislation.

Mr. STUART remarked that the question had been raised on the Lambeth Bill.

After deliberating in private, the Committee decided that the clause should run as follows:—

Notwithstanding anything in this Act, or the Acts herewith incorporated, the Joint Committee shall not for the purposes of sale, take any waters in, under, or on the lands authorized to be acquired by them under this Act.

Mr. FITZGERALD then proposed a clause subjecting the Joint Committee to a penalty not exceeding £500 a day for taking water contrary to the provisions of the Act, or delivering more water to the three Companies than the quantity authorized; but it was rejected.

The CHAIRMAN: The next clause is that in which the Conservators say they want £5000; and want it "down on the nail." (Laughter.)

Mr. FITZGERALD: Yes. That sum is to cover immediate expenditure

on the part of the Conservators. It is necessary for them to construct a new weir at Penton Hook, and carry out other works in consequence of this Bill.

The new clause (42H) was as follows:—

(1) The Joint Committee shall, within three months from the passing of this Act, pay to the Conservators the sum of five thousand pounds, which sum the Conservators may apply only for the purposes of any works rendered necessary or desirable by reason of the passing of this Act, or otherwise as they shall think fit.

(2) The Joint Committee shall pay to the Conservators the following sums (that is to say): On the 25th of December, 1897, £750; on the 24th of June, 1898, £750; on the 25th of December, 1898, £1500; on the 24th of June, 1899, £1500; and on every 25th of December and 24th of June thereafter ensuing the sum of £3150. Provided that if the Joint Committee shall at any time before the 24th of June, 1899, commence to take water from the river for the purposes of this Act, they shall, on every 24th of June and 25th of December thereafter next ensuing, and for ever after, pay to the Conservators the sum of £3150. Provided also that if and so long as the Joint Committee shall be authorized by the Local Government Board to take any quantity of water in excess of 35 million gallons daily, the half-yearly amount payable by the Joint Committee under this section shall be proportionately increased. Provided further that the provisions of section 294 ("Payments of Companies to be without deduction and free from income-tax," &c., of the Thames Conservancy Act, 1894, shall, *mutatis mutandis*, apply to such half-yearly payments. The moneys payable under this Act shall be in addition to, and irrespective of, any payment to be made to the Conservators by the Companies, or any or either of them, under any other Act or under any agreement.

(3) If any of the payments by this section required to be made by the Joint Committee are not made at the times hereinbefore specified, the three Companies shall be jointly and severally liable to pay the same to the Conservators; and the same shall be the first charge on the net receipts of the said Companies respectively, subject to any debts or charges payable thereout or charged thereon respectively before the passing of this Act, and in priority to any claim of any shareholders, stockholders, proprietors, or members of or in the said Companies respectively, to any dividend or share of profits; and from and after the 24th day of June which shall be next after the passing of this Act, it shall not be lawful for any of the said Companies at any time to pay or divide any dividend or share of profits or receipts to or among any shareholders, stockholders, proprietors, or members of or in the said Companies respectively, unless and until the Joint Committee or the said Companies have paid to the Conservators the half-yearly payment accrued, due from the Joint Committee under this section at the then last preceding 24th day of June or 25th day of December as the case may be. The Conservators shall carry to the Upper Navigation Fund constituted by the Thames Conservancy Act, 1894, all sums paid to them by the Joint Committee under sub-section (2) of this section.

Mr. BAGGALLAY said the promoters were ready to give £5000 down to the Conservators to meet the expenditure on new works. The only point between them was whether the Conservators should have £6300 a year. He thought, moreover, that it should be stipulated that whatever sum was paid to the Conservators should be expended, not on works for improving the navigation of the river or the drainage of land, but on improving the upper river above the points of intake.

Mr. FITZGERALD declared that, looking at the wealth of the Companies, £6300 was not an unreasonable sum.

Mr. FREEMAN said that this annual payment was asked for for locks and land drainage. As, however, the water to be taken under the Bill was to be drunk in London, he thought the money should be expended in preserving the water in an absolute state of purity. The County Council also asked that, in the event of the works authorized in the Bill being purchased by a local authority, that authority should not be required to continue these payments unless they continued to take the water.

Mr. RIGG, as representing the Corporation of London, said he could not join in the view of the London County Council. The money might well be spent in the navigation of the river, as that was affected by the abstraction of water in the upper reaches.

Mr. BAGGALLAY said the material question was as to amount. He thought that the word "shall" should be inserted in the first part of the clause, so as to compel the Conservators to spend the £5000 on works rendered necessary under the Bill.

Mr. FITZGERALD agreed with this suggestion.

Mr. BAGGALLAY said the three Companies would be willing to pay an annual sum of £1000 a year each to the Conservators. They thought the amount asked for in the Bill was too much.

Sir R. WYATT pointed out that the Counsel for the promoters, in his opening statement, had declared that his clients would be prepared to pay £4500 a year.

The Committee deliberated in private; and in the result announced that they had agreed to allow £5000 per annum to the Conservators, to be paid half yearly on the 24th of June and the 25th of December next succeeding the commencement to take water from the Thames.

The clause was amended accordingly and added to the Bill; the word "shall" for "may" being substituted in the early part, and other verbal alterations being effected.

A clause to the effect that nothing in the Act should be deemed to confer upon the Joint Committee any priority of right to take water from the Thames or any tributary thereof as against any company, body, or person already, or who might hereafter be, empowered by statute to take water from the river, was agreed to.

Another clause (42I), providing that the flow of water at Penton Hook should be ascertained by suitable appliances to be provided for the purpose by the Conservators, and be under their control, was added to the Bill.

The Committee then proceeded to consider sundry amendments proposed by the Middlesex County Council for the protection of roads and footpaths; and a clause was agreed upon.

Other amendments having been agreed to, the Bill was passed, and ordered to be reported to the House.

Bournemouth Gas and Water Bill.

On Friday, the 26th ult., a Select Committee of the House of Lords had before them the Bournemouth Gas and Water Bill, which had already passed a Select Committee of the House of Commons. Mr. Claude Baggallay and Mr. Bauman appeared in support of the Bill; and the only petitioner against it—Mr. F. G. Case—appeared in person. Mr. Case is the leaseholder of a cottage adjacent to the Company's works, and he alleged that on the land the Company seek power to acquire they may build works which may be very offensive to him, and injuriously affect his premises. He therefore asked that a special compensation clause for his protection should be inserted in the Bill. The Company declined to agree to this arrangement, urging that the works were now being, and would be in future, conducted in an unobjectionable way; that no offensive works (as petitioner suggested) would, in all probability, be erected on the new land which they sought to acquire near his cottage; and, further, that, if he suffered any damage or loss, he would be sufficiently protected by the Lands Clauses Act. After a hearing which lasted over the latter part of Friday's and the early part of Monday's sitting, the Committee passed the preamble of the Bill; and with regard to the special clause which they were asked to insert for Mr. Case's protection, they decided not to allow it, in view of the remedy he would have under the existing law.

Chester Corporation (Dee Sluices) Bill.

The Police and Sanitary Regulations Committee have lately had under consideration the Chester Corporation Bill, the objects of which were to empower that body to construct a weir or tidal dam across the Dee, and to enlarge their powers to prevent the pollution of the river. The Bill was opposed by the Duke of Westminster and certain riparian owners, the Dee Conservancy and Fishery Boards, and others. The cost of the proposed works, which had been designed by Mr. F. G. M. Stoney, M.Inst.C.E., was estimated at £40,000; and the Bill provided that one-half of this amount should be borne by the Chester Water Company, who would necessarily be benefited by the improvement of the river which would result from the carrying out of the scheme. There was some little difficulty on this point; but during the progress of the inquiry, the promoters and the Company, at the suggestion of the Chairman of the Committee (Mr. Mount), settled the terms of an agreement based on the assumption that the scheme was sanctioned in its entirety. Under it, the Company's contribution to the cost of the works was limited to £15,000. Last Tuesday, however, the Committee decided that the powers sought by the portion of the Bill relating to the pollution of the river could be obtained in the manner provided by existing Acts, and need not, therefore, be granted specially. This decision, of course, prevented the scheme going forward as a whole; and, as a consequence, the Water Company's provisional agreement fell through. The promoters nevertheless expressed their intention of proceeding with the rest of the measure; and it was under consideration till Friday, when the Committee declined to pass the preamble, and decided not to award costs to any of the petitioners. Next to the fight over the Barnsley Bill, the "Battle of the Sluices," as it has been called, has proved more severe than any other contest this session in connection with water-works legislation, apart from the Metropolitan Water Inquiry.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Thursday, July 2.

(*Before the* LORD CHIEF JUSTICE *and a Special Jury.*)

Goodson v. Sunbury Gas Consumers' Company, Limited—The Reinstatement of Roads.

This was an action to recover damages for personal injuries sustained, as was alleged, by the negligence of the defendants. The defence was a denial of negligence.

Mr. KEMP, Q.C., in opening the case, said the plaintiff was an omnibus driver who had for twelve years been in the service of the London General Omnibus Company, earning wages of 6s. 6d. per day. In August, 1895, the plaintiff and other drivers of the Company had a "beanfeast," in connection with which they proposed to drive to the Prince Albert public-house near Staines. The party were in two brakes, to the number of 52 men; and when they were near the public-house, the brake in which the plaintiff was had to turn to let a vehicle pass, and in so doing had to leave the crown of the road, which was macadamized. The result was that the wheels of the brake sunk right into the ground, and the brake was thrown over; one of plaintiff's legs being broken. His case was that the defendants were responsible for the accident, as they had opened the road and improperly filled it in. By the Gas-Works Clauses Act, 1847, it was provided (section 10) that "When the undertakers open or break up the road or pavement of any street, . . . they shall, with all convenient speed, complete the work for which the same shall be broken up, and fill in the ground, and reinstate and make good the road or pavement, . . . and shall keep the road or pavement which has been so broken up in good repair for three months after replacing and making good the same, and for such further time . . . as the soil so broken up shall continue to subside." By the next section, there was a penalty imposed upon them for not fulfilling their duty under the section—namely, that they should forfeit to the persons having the control or management of the soil of the street the sum of £5 for every offence, and an additional £5 per day. But this, he submitted, in no way took from a person who was injured by their negligence the common law or statute right to recover from them in respect of neglect to do that which it was their duty to do. It was suggested, on behalf of the defendants, that the mischief arose from the overflow from a fire-plug.

Evidence having been given for the plaintiff and defendants,

The LORD CHIEF JUSTICE summed up, and left the following questions to the jury: (1) Did defendants fail to reinstate and make good the road? (2) Did they keep the road or pavement which they had broken up in good repair? (3) Was the filling up negligent or not? (4) Was the failure to keep in repair negligent? (5) Was the accident

caused by the failure you have found, and by their negligence? (6) Did the state of the road over the drainage and the condition in which it was on the 13th of August constitute a nuisance in a public highway for vehicular traffic? (7) Was that nuisance caused by the defendants? (8) What damages do you find for the plaintiff?

The jury replied in the affirmative to the first question; and also to Nos. 3 to 7. They answered the second in the negative; and gave the plaintiff £250 damages.

Mr. COCK, Q.C., on behalf of the defendants, then submitted that the defendants were only subject to the penalty provided by the statute, and that therefore judgment ought to be entered for them.

Mr. POWELL, for the plaintiff, submitted that the fact that a penalty was provided by statute did not take away plaintiff's cause of action.

Arguments on this legal point were heard and continued on the following morning.

The LORD CHIEF JUSTICE said he would reserve judgment.

A Question as to the Application of the Gas-Works Insurance Fund at Stalybridge.

An important application was made by the Town Clerk (Mr. John Miller) to the Stalybridge Borough Bench last Wednesday. The Magistrates who heard it were selected from those gentlemen who are not members of the Town Council. Mr. Miller, by direction of the Gas Committee, sought for power to appropriate from the insurance fund provided in connection with the works a sum of £3000 to meet the expenditure necessitated by the erection of a new retort-house chimney and the supply of generator furnaces. He made the application under section 28 of their Act, which provides that the fund in question shall apply to any extraordinary claim, demand, or charge which may arise from accidents, strike, or other circumstance which, in the opinion of the Justices, due care and management could not have prevented. The question to decide was the construction of these words. The Gas Committee held that the extraordinary nature of the work in course of progress justified the diversion of the money out of the insurance fund and its application to the purpose in hand; but the Bench, interpreting the language of the section more strictly and more narrowly, considered that the section did not apply, and refused to grant the order asked for.

Wasting Water at Batley.

Reference has already been made to the vigorous measures adopted by the Water Committee of the Batley Corporation to put a stop to the waste of water which has been going on in the borough. Unpleasant as it must have been for the Committee and their Engineer and Manager (Mr. Oscar J. Kirby, Assoc.M.Inst.C.E.) to be continually resorting to legal proceedings, in almost all cases they have been productive of good; and the result has been such a check of the waste that the consumption of water for domestic purposes is now less than 12 gallons per head per diem. This satisfactory result, however, does not justify them in relaxing their efforts to bring to justice those who persist in offending; and consequently the Magistrates at the Batley Police Court have lately had to deal with three cases of this kind. One was that of a cowkeeper who had already been fined for wasting water; and, as the Town Clerk remarked, it really seemed as if he were trying his strength with the law. However, the law was too much for him; and, his offence having been proved, he was fined £1 and costs. The second case was that of a hairdresser, who did not appear in answer to the summons, but sent his son, who denied that the water had been left running, as he had himself turned off the tap. But the evidence against him was too strong; and he was fined 10s. and costs. A similar fate befel the third offender, who wanted to make out that his tap was not in order. He was very properly told that this was the occupier's business, not that of the Corporation. A few examples of this character should have a deterrent effect.

Serious Explosion in Connection with the Birmingham Welsh Water Scheme.—An explosion took place at Knighton last Thursday on the works in connection with the Welsh water scheme of the Birmingham Corporation. Five men were injured, and one is not expected to recover. The accident occurred on the portion of the work entrusted to Messrs. Morrison and Mason, of Glasgow. In the section between Dolau and Knighton an aqueduct is being constructed; and, when completed, it will be about 4 miles long. About ¾ mile from the entrance to the tunnel at the Bleddfa end, the men had laid a charge with the view of removing some rock. So far as can be ascertained, it is supposed that they had concluded that the shot had misfired, and were going to lay another fuse when the explosion took place. One man's skull was shattered; and there is no hope of his recovery. Two men would lose at least one eye each, two others were slightly injured, and a sixth escaped with a shaking.

Darwen Corporation Gas and Water Finances.—The Darwen Borough Treasurer (Mr. J. H. Ellison) has just issued his annual abstract of accounts. Referring to the Gas Department, he says that the profit on the past year's working was £3103, and that the cost of coal per ton carbonized was 8s. 11·48d., as against 10s. 4·72d. in the preceding twelve months. The increase in the consumption of gas over the previous year was 2,302,850 cubic feet, as compared with 9,730,950 cubic feet for the twelve months ending March, 1895. This falling off was attributable to the fact that the large paper-mills in the town had adopted the electric light in substitution for gas. As to the water-works, there was a loss on the year of £3 7s., as against one of £379 11s. 5d. during the previous twelve months. The aggregate balance-sheet shows the total Corporation property to be valued at £522,336, with liabilities amounting to £405,927, which leaves a surplus of assets over liabilities of £116,409—an increase of £13.538 since March last year.

MISCELLANEOUS NEWS.

THE LIVERPOOL CORPORATION AND THE GAS COMPANY.

The Special Report of the Lighting Committee Adopted.

At the Meeting of the Liverpool Corporation last Wednesday, the special report of the Lighting Committee on the gas supply of the city (a summary of which was published in our issue for June 9) was presented; and it gave rise to a long and spirited debate.

Sir ARTHUR FORWOOD, the Chairman of the Committee, moved the adoption of the report. He said that, during the quarter of a century he had been a member of the Council, the gas question had formed a most useful and fruitful subject for the election addresses of new members. Until the last two or three years, it was dealt with from an entirely non-party point of view; but since then, it had been treated differently—in fact, it had been stated that their position as regarded the Gas Company was a legacy of Tory Administration. He thought it would be admitted that in 1841 the great party of reform—the Progressive party—had control of the administration of the city; and they were the people who first allocated to the Company the handsome dividend of 10 per cent., and protected the gas consumers by limiting the charge to be made to 6s. per 1000 cubic feet. So that the Tory legacy went back to a date when, for a short period, the Reform party were in possession of the Town Hall—for a short period, as the ratepayers found out then, as they did recently, that they had had enough of that *régime*. Moreover, it had been pointed out by a member of the party opposite that Tory members of the Council were interested in various other giant monopolies in the town, that the Gas Company were paying twice as much for their coal as they should, and that the Corporation were custodians of the interests of the consumers of gas. If they were the custodians of the interests of the consumers, it was very strange that trustees should fight the Company for a reduction in the price of gas for street lighting, and force upon consumers the cost so saved; and, further, should compete with the Company by taking over an undertaking to supply the city with electric light, which meant less gas burned and a greater burden on the consumer. The attitude of the Council during the past three years had been one of hostility—so much so that, when it became desirable to communicate with the Directors, the latter declined to meet the Lighting Committee or furnish any information. [Alderman F. SMITH: When?] When the Committee asked the Company for certain information which had been promised, a resolution was brought before the Council and passed, to the effect that the Corporation should take steps to obtain powers to provide works to compete with the Company. He could not conceive any action which was more likely to produce a spirit of hostility. He thought the public should not be misled as to the relative positions of the Company and the public as set out by Acts of Parliament. It was a mistake to let the people of Liverpool be in a Fool's Paradise. A great deal had been said about a 10 per cent. dividend; and many people undoubtedly imagined that every shareholder of the Company was receiving 10 per cent. on his money. If the public looked into the matter, it would be found that, out of a total capital of £1,300,000, stock was only issued to the extent of £228,000 on which 10 per cent. was paid. This stock was issued in 1848; and the holders had to run the risk of the trade experiment as to whether gas would be generally adopted. It was true that more of the 10 per cent. stock had been issued since 1848; but what were the facts? The stock was offered by public auction, and was sold to the highest bidder. Therefore over and above the £228,000, it was misleading and ridiculous to make people believe that 10 per cent. had been paid upon stock since issued. Having referred to the issue of 7 per cent. stock, he mentioned that the stock had appreciated so much that it now stood at £196. He could conceive of no stronger case as to the rights of property than stock purchased in this manner by public auction. If they were to attempt, by the Council or by Parliament, to disturb the rights of men who had acquired their property in this manner, then clearly no one's property in the country, from the humblest to the highest in the land, was safe for one moment. The Company, moreover, were safeguarded by Parliament; and the Council themselves were debarred from taking steps in regard to a competitive supply. He knew no class of property that had been so carefully safeguarded by Parliament as that represented by gas stock. It would be idle to think of purchasing the Company on any basis other than that of recognizing the rights which the holders of stock possessed under parliamentary powers. He made this point because he wanted the Council to consider the question of purchase. He was glad that Alderman Smith agreed with him in deprecating the purchase of the Gas Company. After the electric lighting transaction, he did not wonder at Alderman Smith's attitude. During eight years or so, the Electric Supply Company had expended £250,000 on capital account; and the Corporation had had to pay £400,000 for the concern—the Company thus receiving a bonus of £150,000. This only showed that a transaction of that description, entered into voluntarily with a concern which had not the vested interests of the Gas Company, did land the Corporation, and would land the public, into paying a very excessive sum. If they wanted to buy the Gas Company, the matter would most likely go before an arbitrator, who would undoubtedly give the market value and something more. The gas stock and debentures at the market price of to-day represented £3,360,000; and he took it that the Corporation could float a loan sufficient to buy the gas-works at some 2½ per cent., which would represent £84,000 a year. Then came another point, which was a very serious one for the Corporation to consider. If they bought the concern, they would have to provide a sinking fund, and charge the consumers with whatever might be the amount necessary; and if they followed the instalment principle of the high financiers of the Liberal party, there would be a total annual charge on the gas consumers of £164,000, and it would be 25 years before consumers obtained any benefit from the purchase of the undertaking.

Alderman SMITH: What would you do with the reserve fund of the Company?

Sir A. FORWOOD said it would probably be taken by the arbitrators, as the reserve fund of the Electric Light Company had been taken, to

compensate officials and others for the loss of their positions. He hoped the Council would agree with him that, from a financial standpoint, it would be the height of folly and madness for them to embark on a scheme for the purchase of the undertaking. If the Council decided against the purchase, then their attitude towards the Company ought to be of the most friendly and cordial character. They were manufacturing gas for the public rather than for themselves. They could charge as high as 4s. 6d. per 1000 cubic feet; but as they only charged 2s. 10d., there was a margin of 1s. 8d. before their dividend came into jeopardy. Their position of security was so complete that they could pretty much dictate the position to be adopted. [Alderman SMITH questioned this.] They had (proceeded Sir Arthur) to accept actualities; and it was just as well they should realize the precise state of things. They should let the Company understand that they had no feeling of hostility to them; that they had no desire whatever to interfere with their just rights; and that they wanted them to go hand in hand with the Corporation in the endeavour to obtain for Liverpool the cheapest and the best gas, giving them due security for their investments. The gas supplied in Liverpool was the highest light-giving gas produced in the country. As stated in the report, the gas, which was required to be of the standard of 20 candles, left the works equal to 21·55 candles. He said, without fear of contradiction, that the gas was of better quality, and of more uniform illuminating power, than that obtained in Manchester or Birmingham, where it was manufactured by the Corporations. Of course, in order to obtain such high-quality gas, enrichers were required; and the cost of production was increased. Still, seeing that, owing largely to the introduction of water gas, the manufacture of gas was at present in a state of transition, the Committee did not now recommend any reduction in the standard of power. He would not go into the question of the cost of production; but he thought it would be found that the cost of gas manufacture in Liverpool was reasonable compared with many towns. The public had been freely told that the Company paid 20s. 7d. a ton for their coal; but they did not pay anything of the kind. They were now paying 11s. 8d. a ton; and the coal was obtained by tender in the open market. He had every reason to believe that the coal was bought in as honest, fair, and satisfactory a manner as it could be by the Council. He did not know that a body of eight or ten men in the Council could be found more capable or more honest in the administration of their work than the Directors of the Company. Alluding to the remedies suggested in the report, Sir Arthur said he thought it was desirable that the introduction of labour-saving appliances, the doing away with small gas-works, and other practical suggestions, should be carried out. He believed that, if the Company felt that the Corporation wished to act fairly and squarely by them, they would co-operate with them in bringing their manufacturing standard up to a higher point even than it reached at present. Therefore, he strongly advocated the part of the report which indicated a desire to induce the Company to take up this question and deal with the matter of manufacture. Then it would be a satisfaction to the Corporation and the public if the Company accepted on their Board one or two members of the Council; and, furthermore, it might be desirable that the Auditor should have greater powers of bringing forward matters in which he thought the Company were not exercising most careful discrimination and management. He concluded by moving: "That the report as adopted by the Lighting Committee be approved, and that it be referred to the Lighting Committee to take such steps as they may think advisable to carry out the recommendations contained in the report." He might at once tell the Council that he had no doubt the first step taken by the Committee would be to send a copy of the report to the Directors of the Company in order to obtain their views, which would be of considerable use in determining the future policy of the Committee. He hoped, by the vote they would come to that day, that they would put an end to the feeling of hostility that had been engendered in years past. Only by friendly and cordial co-operation, did he think they would be able to bring about a better state of things as regarded the price of gas in Liverpool.

Mr. C. PETRIE seconded the resolution.

Alderman F. SMITH desired to know whether an answer had been made by the Gas Company to the March report.

The TOWN CLERK replied that he had only received a formal reply from the Gas Company.

Alderman SMITH then proceeded to reply in detail to the arguments of Sir Arthur Forwood. It was, he said, really not until 1891 that feeling on the gas question became so acute; and it was when the Company raised the price of gas from 2s. 8d. to 3s. that the consumers naturally grumbled. In 1892 there was a change of parties; and the gas question received some little attention. On Oct. 3, 1893, the Company were asked to give the Corporation special terms with regard to some experiments having as their object a reduction in the cost of the city lighting. As to the action which it was claimed was taken by the Conservative party, he asserted that, with the exception of Dr. Cross, not one of them attempted to deal with it. A good many of them were wealthy men, and were gas shareholders; and the Company had a really "good old time," and had no reason to complain. In reply to the request courteously made, the Company, instead of falling in with the suggested economical arrangement, said they would have to charge 2½d. per week in the place of the 1d. The Lighting Committee, therefore, took the matter in hand, and made the arrangement themselves, and secured a saving of from £5000 to £6000 per year—an advantage wisely maintained by the present Lighting Committee. Again, water gas was being brought prominently forward; but were the Lighting Committee attempting in any way to introduce it on behalf of the people of Liverpool? As to Sir Arthur's remarks about the price the Company had the power to charge, they could not for very shame charge the maximum price. Of course, the report could not have been drawn up by an officer of the Gas Company; but he ventured to say that an officer of the Company could not have drawn up a better report in the interests of the Company. Mr. Petrie, a member of the Lighting Committee, had said that the Company sold their residuals at an enormously high price. Then the phenomenal figure paid for coal was still unaccounted for. He repudiated the assertion that the Company were not approached by the former Committee in a proper spirit; they approached them in the most open-minded manner, with the earnest desire to obtain a fair arrangement. At the meeting in May, they discussed the question of lowering the candle power; and they asked the Directors to give the consumers the annual saving in coal. The Council said: "We do not want to touch your charges, profits, emoluments; but give us the coal saving, and we will consider it." This meant that they would get gas 1s. per 1000 cubic feet cheaper; but, of course, they were laughed to scorn. They came now to the change of government; and, regarding him (the speaker) as a "stormy petrel," he was excluded from the Committee, though he had taken a good deal of trouble, and he thought he was entitled to a seat. He was bitterly disappointed that Sir Arthur had not brought the matter to a fair and satisfactory conclusion. He was strong enough, and ought to have been able to do it. They were entitled to expect it; but certainly they did not expect a miserable report which suggested nothing whatever for the benefit of the consumers. Reference was made in the report to the introduction of improvements; but there was no suggestion that the consumers should share in any benefit these might produce.

Alderman STOLTERFOHT: They cannot make more than 10 per cent., or they would have to reduce the price of gas.

Alderman SMITH said it was delightful to hear the innocent way in which Alderman Stolterfoht talked about reducing the price. There had scarcely been a period when coal was of less price in recent years than now; and yet the Company charged 2s. 10d. instead of 2s. 8d., which had been the normal price for many years. The report stated again that the selection of materials was well and carefully made; but on whose authority was this statement given? The Company did not get the coal from colliery proprietors direct; but through a London firm of coal dealers. The Council reasonably expected that, with such gentlemen as Mr. Edward Lawrence upon the directorate—men of experience and knowledge in coal matters—the Company could buy coal better than anybody else; but while the Manchester people went to a place within 15 miles for their coal, Liverpool went to the other ends of the earth—to Australia and so on. With regard to the lighting of workmen's houses, Sir Arthur knew that such houses were not lighted by gas; but if the supply was in the hands of the Corporation, this would be altered, because the working men would not stand it. Then, again, business men would not send coke out of Liverpool at an abnormally small price, while in Liverpool it was at an abnormally high price. He would not impute motives to Sir Arthur Forwood, but would say he had rather a mental squint. If he were to impute motives, he should say that he put certain people on the Committee, knowing perfectly well that they would do no good. Sir Arthur abandoned all he said before in favour of the Gas Company in coming to this conclusion: "That it is evident improvements in the manufacture which would cheapen the production of gas are possible; and the Directors of the Company should be urged to take the necessary action." Sir Arthur had asked them to pass a glorious certificate to the Company all down the line; and to believe that they were doing all that moral, able, and honest business men could do. Then Sir Arthur went on to tell them that the Company were evidently not doing their duty, and ought to be urged to do it. He (Alderman Smith) moved as an amendment that the report be referred back to the Committee with instructions to ascertain upon what terms the Company's undertaking could be purchased by the Corporation.

Alderman BOWRING seconded the amendment. He said it seemed to him that Sir Arthur Forwood appeared there in a dual capacity as the Chairman of the Lighting Committee and the advocate of the Gas Company; he went so far almost as to imagine the concern a philanthropic one, doing business for the benefit of the ratepayers of Liverpool. He had read through the report; and he thought, according to his reading of the recommendations, that, if the resolutions of the Committee were carried out, it would prevent negotiation in the future with the Gas Company.

Mr. PETRIE pointed out that the report did not close the door to negotiations with the Company in future. The Committee passed their recommendations after very careful consideration of the reports of experts, and personal investigation. The motion would not tie the hands of the Lighting Committee or the Council, but was simply intended to ascertain the opinions of the Directors.

Alderman WILLIAMS supported the amendment, and endeavoured to show that Liverpool was favourably situated, so far as the cost of the carriage of coal was concerned.

Mr. H. BANNER remarked that the Committee, in the conclusions they arrived at, simply made certain suggestions, before they came to any conclusion as to whether they should purchase the undertaking or not. They were not pledged to accept every statement included in the reports of the experts.

Mr. TAGGART regarded the recommendation of the Committee as absolutely ridiculous, and said the sooner the Corporation took over the control of the gas-works the better it would be for the ratepayers and all concerned. Their first consideration would not then be the 10 per cent. dividend, but to make the works pay in order to give the benefit to the community.

Sir A. FORWOOD said he would put it to any man of common sense whether a body of Directors in charge of an undertaking like that of the Gas Company were going to mention either their price or their terms to an inquirer who had no power or instruction to purchase. If they wished to purchase, it was far better that the negotiations should be definitely entered into for the purpose. He wished to remind members that, if any member of the Council were placed on the Board, he could receive no remuneration.

Mr. BELOE asked whether shareholders in the Gas Company were at liberty to vote upon this question?

The TOWN CLERK replied that the amendment before the Council involved the referring back of the report of the Committee for reconsideration; and he did not think there was any pecuniary interest in question which would prevent shareholders voting.

The division was then taken on the amendment, which was lost by 24 votes to 51.

Mr. LYNSKEY then pointed out that there was nothing in the motion to show that the Committee would be under the control of the Council in this matter. He thought the words "and report thereon to the Council" ought to be added.

The TOWN CLERK said he understood the recommendations of the

Committee to involve negotiations with the Gas Company for the amendment of their Acts, in the direction indicated by the report. If the Committee succeeded in these negotiations, then he took it they would inform the Council of what they had done; but the taking of parliamentary proceedings to carry out the arrangements that might possibly be come to, must be initiated by the Company and not by the Corporation.

Mr. LYNSKEY submitted that, without the addition of the words he had suggested, they were throwing away their control into the hands of the Committee.

Sir A. FORWOOD did not object to the additional words.

With the addendum, the motion was carried by 53 votes to 23.

THE PROPOSED ACQUISITION OF THE ASHFORD GAS WORKS BY THE DISTRICT COUNCIL.

Report by Messrs. Stevenson and Burstal.

On Thursday, there was a private conference between the Directors of the Ashford Gas Company and representatives of the Ashford District Council, in connection with the proposal of the latter body to acquire the Company's undertaking, to which reference was made last week. This question has been agitated ever since 1870; but it has now so far advanced as to be accepted by a statutory meeting, preparatory to calling a meeting of ratepayers. At the instance of the Council, Messrs. Stevenson and Burstal, MM.Inst.C.E., of Westminster, have gone into the question and prepared a long report. In the course thereof, they state that they have made an inspection of the district; and, so far as they can judge from the outside (as they were not allowed to enter), they are satisfied that the gas-works are generally in very good order, and that all the structures have been properly maintained. They believe the retort power is slightly in excess of the daily make; and that the capacity of the three holders is about sufficient. There seems to have been a continued increase in the sale of gas year by year. The balance-sheets for the last six years appear, so far as the revenue account is concerned, to be simply a cash account of money received and expended. It is presumed that the amount received for residual products, fittings, &c., follow the same lines. The balance-sheets disclose that the Company have yearly spent large sums out of revenue upon the extension of the works and mains; and during the years under review, they have expended £2444 out of revenue upon capital account, which represents a tax on the consumers of 3½d. per 1000 cubic feet of gas sold in the five years. The whole of the money, however, has been spent the last four years; and therefore it represents rather more than 4½d. per 1000 cubic feet upon the gas sold. The Company paid 8 per cent. dividend for the years 1891-2-3, and 10 per cent. for the years 1894 and 1895. In June, 1894, they issued £7000 worth of shares to their shareholders; making a call of £3 per share, and paying at the same time to each shareholder a cheque of equal amount—the Directors stating that this bonus came out of the undivided profits of the Company. But among the assets which went to form this undivided profit, they took credit for the amounts spent on the extensions of the works in 1892-3-4; and it is not clear to the reporters how the Company were able to dispose of these works in order to pay a portion of this bonus. The Company had also a balance from the revenue account of £2101 in 1894; but after paying a bonus of £4140, they still carry forward this balance in 1895, and use it for the payment of the ordinary dividend. The whole transaction was, the reporters say, nothing more than a "watering" of the capital, which is always looked upon with very serious disfavour by Parliament. It is not very easy, from the accounts as they stand, to arrive at the amount expended on repairs and maintenance; but Messrs. Stevenson and Burstal imagine, from an inspection of the documents which have been handed to them, that practically enough has been spent on the ordinary repair and maintenance of the works. If this be so, it will be apparent that during the last four years, besides paying an average dividend of 9 per cent., the Company have put into their works out of profit, and taken out of the pockets of the consumers, a further dividend amounting in the whole to 19 per cent. upon the share capital, and have capitalized the greater portion of this, and put it into their own pockets—adding to the capital account the amount spent out of profit in 1895. The increase in the sale of gas during the last five years has been at the rate of 5 per cent. per annum; and there is no reason why this should not continue. As to whether or not it will be advisable for the Council to acquire the gas undertaking, Messrs. Stevenson and Burstal say it is only necessary to point out that, almost without exception, every gas undertaking in the hands of local authorities pays its way; often leaving a considerable profit, which can be used either in reducing the price of gas or in assisting the rates. In this particular case, there can, they say, be no doubt that the transference will be of advantage to the ratepayers, as the existing works could be adapted to the requirements of the town. The approximate sum for which the works should be acquired is not, in the absence of free access to the books of the Company, entered into by the reporters. We understand that, as the result of the conference on Thursday, there is a good prospect of the matter being settled by arbitration or agreement.

Mundesley Water Supply.—Mr. W. O. E. Meade-King, M.Inst.C.E., an Inspector of the Local Government Board, conducted an inquiry at Mundesley last Tuesday, in respect of the application of the District Council for powers to borrow £2500 for new water-works. Evidence was given to the effect that the present supply is obtained from wells, many of which, according to the statement of the Medical Officer of Health (Dr. Richardson) contain impurities; and it is proposed to bore into the chalk, which is calculated to yield 16 gallons per head per day. A memorial against the scheme was put in; but as it was stated that half the parish is now without water, it will possibly not have much weight with the Local Government Board.

THE EXTENSIONS AT THE WIDNES GAS-WORKS.

Opening Ceremony.

The annual inspection of the Widnes Gas-Works by the members of the Corporation, public officials, and others, which took place last Tuesday, was made the occasion for the inauguration of the extensions which have been carried out during the past two years. They have been necessitated by the rapid increase in the consumption of gas since 1883, when the quantity supplied was 69 million cubic feet, compared with 186 millions in the year just closed. The alterations in the plant (which are not yet quite complete) will raise the manufacturing capacity from 1 to 1½ million cubic feet per day, or equal to an annual consumption of 350 millions. The new works comprise condensers, steam-boilers, engines and exhausters, washing and scrubbing plant, station meters and governors, tar and liquor tanks, wells and pumps, sulphate of ammonia plant, a railway siding extension, and all necessary additional buildings—the latter including commodious workshops and stores. In laying down the scheme for the new plant, one of the main objects was to separate, as far as possible, the carbonizing and purifying departments. This will allow of the yard being kept in much better order than hitherto, and enable the work to be carried on with greater ease and economy. The alterations to the offices give the Engineer and his staff, including the time and store-keepers, rooms in direct communication with each other; whereas under the old arrangement they were divided. With regard to the plant itself, the underground condenser is 30 inches in diameter and 100 feet long; and it connects with a second, which is water cooled. The engines and exhausters are in duplicate; the capacities being 80,000 and 40,000 cubic feet per hour respectively. One is new, and the other was in use before. Steam is supplied from two steam boilers, working at 100 lbs. pressure. One is of the Lancashire type, 22 ft. 6 in. by 7 ft., and is quite new; the other, of the Cornish type, 18 ft. by 6 ft., has been removed from the old site. The engine and boiler houses, which are spacious and well ventilated, are brick built, and are of neat and slightly ornamental design. The washer measures 10 ft. 6 in. by 8 ft. by 4 ft.; and the tower scrubbers are 12 feet inside diameter and 78 feet high. The purifiers, which were extended six years ago, are at present of ample capacity; and consequently they have not been altered. The stores, workshops, meter-houses, &c., form a two-storey block 96 feet long, 28 feet wide, and 29 feet high, in continuation of the old offices. The meter and governor room contains the old station meter of 20,000 cubic feet capacity, which has been thoroughly overhauled, and also one of 40,000 cubic feet per hour, purchased from the Bolton Corporation, and put into good order. The governors are 14-inch. The underground mains are 16 inches in diameter; and the length laid to connect the various portions of the plant is 1147 feet—23 valves being employed. Including the tar, liquor, steam, and water connections belonging to the new plant, the total length laid under ground is 5000 feet. Extensive storage accommodation for tar and ammoniacal liquor has been provided by converting the old small gasholder tank, 53 feet in diameter and 20 feet deep, into two separate wells—one for tar and the other for liquor—having a total capacity of 700 tons, as against 230 tons, the capacity of the old well, in which tar and liquor were stored together. The wells are covered with a strong roof in steel joists and concrete, supported from the under-side with brick cross walls in hydraulic mortar. The covering of this tank has effected a valuable increase in yard space at the oxide ground, where additional room was greatly needed; the extra space now available amounting to 312 superficial yards. The pump-house is surmounted by a cast-iron tar-tank of 23 tons capacity. The sulphate-house is a spacious building 40 feet long, 30 feet wide, and 15½ feet high. Storage is provided for 100 tons of sulphate; and the plant, which is equal to the production of 30 cwt. per day, is fitted with all modern improvements for economic and efficient working. The railway siding has been extended a distance of 123 yards, to give additional waggon room, and to bring the lime, the oxide, and the acid up to their respective places.

The contractors for the tower scrubbers were the Widnes Foundry Company; for the combined steam engine and exhauster, Messrs. G. Waller and Co.; and for the condensers, washer, tar-tanks, and sulphate of ammonia stills, Messrs. R. & J. Dempster, Limited. The whole of the buildings have been erected by the Corporation's own workmen; the labour, bricklaying, slating, and plastering having been done on piecework, the Corporation buying the materials. By this mode of carrying out the work, it is claimed that a large saving in cost has been effected. The scheme of the extension, together with the plant, was planned, the buildings designed, and the whole of the work carried out under the direction and superintendence of the Corporation Gas and Water Engineer, Mr. Isaac Carr, Assoc.M.Inst.C.E., who must be complimented on the effective and economical manner in which the work has been accomplished. The total cost of the extensions so far completed is £8787, of which £4551 10s. has been spent on machinery and plant, and £4235 10s. on buildings.

A large party, including the Mayor (Alderman Sadler, J. P.), having made the tour of the works, they assembled in the meter-house, and Alderman Timmis, the Chairman of the Gas Committee, asked his Worship to start the new engine, and thus formally "open" the additions to the plant. This he did, amid applause. On the invitation of Alderman Timmis, the company drank "Success to the new works," and then went for a drive in the district. The business of the day concluded with a dinner, at which the Mayor presided; Alderman Timmis being in the vice-chair.

Gas-Main Extensions at Barry.—The question of extending the gas-mains from the district of Barry to the village of Dinas Powis is being considered by the Gas and Water Committee of the Barry District Council. Mr. F. M. Harris (the Engineer) has reported to his Committee that he estimated the cost at £2500; but should the consumption of gas continue to increase in the same proportion as during the past three years, a main from the gas-works to Cadoxton of larger area would be required, involving an additional outlay of £3500.

THE EXAMINATIONS IN GAS MANUFACTURE.

The Pass List.

The following are the names of the successful candidates in the last examination in "Gas Manufacture" by the City and Guilds of London Institute:—

HONOURS GRADE.

First Class.—Hislop, L.

Second Class.—Ambler, F. B.; Bingley, J.; Brett, C. G.; Brown, G. E.; Coleman, W. H.; Davies, H.; Dickinson, E. G.; English, R.; Guiver, J. N.; Parsons, F.; Simmers, R. B.; Weippert, E. D.; West, F.; Wildman, J. R.

ORDINARY GRADE.

First Class.—Allin, J. W.; Arnould, A. L.; Bowles, A. R.; Brown, J. H.; Brown, W. E.; Campbell, J. M.; Chalmers, P.; Clark, W. B.; Cockburn, E. F.; Comely, A. N. T.; Davies, G. S.; Golding, J.; Hendrickson, A.; Holroyd, R. E.; Ibbotson, H. J.; Jackson, T. J.; Mackay, J. W.; Madden, H. D.; Mansfield, E. A.; Power, J.; Sainsbury, E. A.; Swain, E. H.; Tanner, C.; Trewby, L.; Williams, P. E.

Second Class.—Alderson, T. H.; Bagshaw, A. H.; Baker, F. H.; Callan, J.; Dew, D. J.; Franks, E. A.; Fullarton, J.; Godwin, J. W.; Heywood, J. H.; Holden, G.; Holt, J.; Jennings, G. L.; Judd, W. M.; Lane, W. T.; Lord, S.; Marston, A.; M'Combie, H. J.; O'Shea, L.; Rapkin, F. W.; Rolph, G.; Roper, W. A.; Shaw, J.; Squirrell, W. J.; Timmins, H. O.

The question papers were given in the "JOURNAL" for May 12 last (p. 1050). The prizes have not yet been awarded.

MANCHESTER CORPORATION GAS AND ELECTRIC LIGHT SUPPLY.

The Annual Accounts.

In the last number of the "JOURNAL," we gave the reports on the working of the Gas and Electric Lighting Departments of the Manchester Corporation for the year ending March 31 last. We now reproduce some of the principal figures in the accounts.

Gas Department.

PROFIT AND LOSS ACCOUNT.

EXPENDITURE.

Cannel and coal (including cost of unloading, &c.)	£230,330	5	0
Retort men's wages	41,209	0	9
Retorts, fire-bricks, &c. (including cost of setting)	13,498	16	0
Repairs and maintenance of works, mains, &c.	58,542	8	10
Purifying material and wages	4,935	0	9
Salaries and wages of clerks in Superintendent's office, rental and inquiry offices, and meter inspectors	17,244	4	1
Collectors', receivers', and cashiers' salaries	7,525	8	11
Rents, rates, and taxes	26,661	13	0
Renewals of plant, &c.	17,599	4	3
Bad debts	550	19	5
Miscellaneous expenses	4,539	14	3
Lighting, repairing, and maintaining city lamps	12,515	11	2
	£435,152	6	5
Balance carried forward	88,063	15	11
	£523,216	2	4
Interest	£31,049	15	9
Sinking funds	17,734	10	9
Balance carried down	39,279	9	5
	£88,063	15	11

INCOME.

Gas-rental				£383,461	19	9
Meter-rents				2,740	15	1
Stove-hire				1,782	13	3
Total cost of street lighting receivable from city fund—						
Value of gas	£30,871	9	2			
Lighting, repairs, and maintenance	12,515	11	2			
				43,387	0	4
Public lamps beyond the city				4,883	8	1
Residual products—						
Coke	£40,634	10	5			
Tar	27,410	18	2			
Ammonia water	18,583	13	5			
				86,629	2	0
Rents of cottages, &c.				331	3	10
				£523,216	2	4
Balance, being the net profit on the year's working				£39,279	9	5
Amount transferred from the contingent fund account				2,775	19	10
				£42,055	9	3
Amounts paid over to the city fund—						
Estimated profit for the year ending March 31, 1896				£27,055	9	3
On account of surplus profits for the year ending March 31, 1895				15,000	0	0
				£42,055	9	3

STATEMENT OF ASSETS AND LIABILITIES.

ASSETS.

Value of stations, mains, service-pipes, hired meters and stoves, Ship Canal wharf, &c.				£1,711,303	11	3
Cannel, coal, retorts, and other material in stock				105,259	19	7
Cash in hand				9,760	3	10
Gas-rents and other accounts due to the Committee				140,287	4	4
City fund for street lighting	£43,387	0	4			
Less received on account, and balance from last year	43,108	17	0			
				278	3	4
Total property and assets				£1,966,889	2	4

LIABILITIES.

Mortgage debt				£876,107	0	0
Amount owing to bankers				47,635	19	3
Sundry creditors				99,709	19	1
Total liabilities				£1,023,452	18	4
Surplus and sinking fund, as per last statement	£886,202	10	0			
Transferred from profit and loss account for the year ended March 31, 1896	17,734	10	9			
				903,937	0	9
Contingent fund account—						
Amount as on March 31, 1895	£42,275	3	1			
Less transferred to the profit and loss account this year	2,775	19	10			
				39,499	3	3
				£1,966,889	2	4

GENERAL SUMMARY OF THE CAPITAL AND REVENUE ACCOUNTS.

RECEIPTS.

Balance brought forward (see summary March 31, 1895)				£126,187	0	0
Loans received during the year				67,450	0	0
Sinking fund, transferred from profit and loss account				17,734	10	9
Balance of profit and loss account (as per statement)				39,279	9	5
				£250,651	0	2

EXPENDITURE.

Loans repaid				£19,970	0	0
Amount paid over to the city fund account				42,055	9	3
Expenditure charged to capital account				80,385	18	2
Stocks on hand, March 31, 1896	£105,259	19	7			
Gas-rents, &c., due	140,565	7	8			
Cash in hand	9,760	3	10			
	£255,585	11	1			
Less accounts owing to sundry creditors	147,345	18	4			
				108,239	12	9
				£250,651	0	2

The accounts proper are followed by the usual appendices, giving some interesting statistics as to the progress of the gas undertaking during the past municipal year.

The figures in Appendix A—a statement of the lamp and private rental, including meter and stove rents, derived from within and beyond the city—have already been given when dealing with the profit and loss account.

Appendix B is a comparative statement of the gas transmitted from the works in the daytime and during the twenty-four hours, for the past two years. Summarized, the figures are as follows:—

	Daytime. Cubic Feet.		Twenty-four Hours. Cubic Feet.
Year ended March 31, 1895	988,362,000	..	3,683,067,000
Do. do. 1896	982,982,000	..	3,762,570,000
Decrease	5,380,000	Inc.	79,503,000

	Cubic Feet.
Quantity of gas transmitted from works	3,762,570,000
" measured and accounted for	3,646,010,000
Loss (by condensation and leakage)	116,560,000, or 3·1 per cent.

In Appendix C, particulars are given as to the results of the working from June 24, 1881, to March 31, 1896. The table contains statistics as to the number of tons of coal carbonized, the total make of gas, the percentage unaccounted for, the yield per ton of coal, the illuminating power of the gas, the quantity of residual products, &c., for each year in the above-mentioned period. The particulars for the past financial year are as follows: Coal and cannel carbonized, 375,514 tons; gas made, 3,764,344,000 cubic feet; yield per ton of coal carbonized, 10,025 cubic feet; illuminating power, 19·55 candles; make, reduced to 20-candle power, 3,679,646,000 cubic feet; make per ton, 20-candle power, 9799 cubic feet; make of coke, 235,173 tons; do. per ton of coal, 12·53 cwt.; make of tar, 23,950 tons; do. per ton of coal, 12·44 gallons; make of ammoniacal liquor (10-oz. strength), 10,472,084 gallons; do. per ton of coal, 27·89 gallons.

Appendix D shows the number of stoves and of each size of meter in use during the year in the city and out-townships. At the close of the past financial year, there were 6042 stoves in use within, and 1977 beyond the city—together, 8019. Of these, 2828 were on hire within, and 953 beyond the city (together, 3781), as compared with 2544 and 835 (together, 3379) at the corresponding date in 1895; so that there was an increase of 402. The numbers of meters in use were 87,242 in 1896 and 82,289 in 1895. There was last year a net increase of 4953 on the number for the preceding year. Of the total number at work on March 31 last, 78,559 were on hire, as compared with 72,881 at the close of the financial year 1894-5. The number of prepayment meters on hire on March 31 last was 3883—an increase of 2402 on the number at the close of the preceding year.

From Appendix E we learn that the gas-mains laid last year within the city amounted to 20,431 yards, and beyond the city to 12,473 yards—a total of 32,904 yards, or 18½ miles 344 yards. The mains taken up

were 7172 and 3424 yards respectively—a total of 10,596 yards, or 6 miles 36 yards. The total net increase during the year therefore was 22,308 yards, or 12 miles 308 yards. The total length of mains laid at March 31 last was 1,296,562 yards, or 736½ miles 322 yards.

Appendix F consists of a statement showing the amount of gross profit made from the gas undertaking, and the mode of its appropriation, also the amount of borrowed money owing, excess of assets, &c., from 1862 to March last. The figures for the past financial year are as follows: Profit, £88,063; paid over for improvement purposes, £42,055; transfer from contingent fund, £2776; borrowed money owing, £876,107; and excess of assets, £943,436. The profit of £88,063 is appropriated thus: Interest, £31,050; liquidation of mortgage debt, £17,734—leaving a surplus of £39,279.

Electric Light Department.

The capital account of this department stands as follows: Loans raised by mortgages, £240,813 16s.; mortgages redeemed by sinking fund, £9186; balance (deficiency), £1689 12s. 9d.—total, £251,689 12s. 9d. Expenditure to March 31, 1895, £174,810 16s. 1d.; do. during year ending March 31, 1896, £76,878 16s. 8d.—total, £251,689 12s. 9d. The following is the

REVENUE ACCOUNT.

EXPENDITURE.

Generation of electricity	£8,206	6	11
Distribution do.	1 274	9	0
Rents, rates, and taxes	1,584	4	8
Management expenses	2,431	19	10
Law and parliamentary charges	137	14	9
Special charges	560	1	0
Bad debts written off	16	9	0
Renewals account (difference between the estimated wear and tear of buildings, machinery, mains, &c., and the repairs and maintenance actually charged)	3,491	14	9
Balance carried to net revenue account	20,549	12	8
	£38,252	12	7

REVENUE.

Sales of current	£37,369	4	4
Rental of meters	883	8	3
	£38,252	12	7

After meeting interest and sinking fund payments, there was left of the above-named £20,549 12s. 8d. a balance of £11,138 10s. This, added to the amount brought forward (£5499 8s. 8d.) made a total of £16,637 18s. 8d., which is thus disposed of: To city fund, £6963 14s. 9d.; to contingent fund, £8521 3s. 11d.; carried to next account (payable to city fund during the year ending March, 1897), £1153.

The report and accounts came before the members of the City Council at their meeting last Wednesday.

Alderman HIGGINBOTTOM, the Deputy-Chairman of the Gas and Electric Lighting Committee, in moving the adoption of the report referring to the Gas Department, remarked that, notwithstanding the rivalry of the electric light, the demand for gas in the city went on just the same. The increased consumption for the year was at the rate of 2·16 per cent., as compared with 4·28 per cent. in the previous year. The number of consumers had increased by nearly 5000, chiefly through the use of prepayment meters, which were being fixed at the rate of 800 to 1000 a week. In reply to a question often asked as to whether these meters proved remunerative, he stated that there was a profit per meter of 6s. 6d. a year after meeting all expenses. Coal had cost 1s. 1d. per ton below the price of the previous year, which made a difference of nearly £21,000. They had, however, received nearly £14,000 less for ammoniacal liquor, owing to a fall in price; but there was now every sign of a reviving market for this article. On the other hand, they had made £8506 more out of tar. The gross profit on the year's working was £88,063; and the net profit, after meeting interest, sinking fund, &c., was £39,279, the whole of which had been paid over to the city fund. The new holder at Bradford Road would soon be ready; and they were about to take down a retort-house at Rochdale Road—their intention being to increase the manufacture at Bradford Road to a corresponding extent.

Mr. M'CABE inquired whether a profit of 6s. 6d. per year on each prepayment meter was not too great.

Mr. SUTTON stated that, in the opinion of working people, they had to pay too much for their gas.

Alderman HIGGINBOTTOM, in reply, said that the profit of 6s. 6d. was to a considerable extent neutralized by the risk of the tenants removing, and the risk of meters being broken open and the money abstracted. It should also be remembered that a bracket and piping were supplied free; and that it took three years to get back the capital expended in this way. This being so, a profit of 6s. 6d. was not considered too much. The question of a reduction in the price of gas supplied through prepayment meters was at present under consideration by the Committee. The reason that the make of gas per ton of coal was lower in the past year than in the previous one was that less expensive cannel had been used.

The report was adopted.

Alderman HIGGINBOTTOM next moved the adoption of the report of the Electricity Department. He said that, in spite of the reduction in price from 8d. to 6d. per unit, they had a profit of £11,138 for the year. The actual profit was £14,629; but it had been thought advisable to place the sum of £3900 to the renewals account for replacement of plant. One interesting feature was that 30 extra motors had been adopted by customers, in addition to 28,662 new lamps. The extension of the plant was very nearly finished, and would last them through the winter; but if the demand for the electric light continued to increase as it was now doing, they would require further additions next year.

Alderman HOPKINSON did not think that as yet manufacturers fully realized the value of electricity for motive power.

Alderman HIGGINBOTTOM intimated that the Committee had made special arrangements with regard to the use of electric motors. Electricity was supplied to them at 1½d. and 2d. per unit, according to the quantity used. The price was very low; but it paid the Committee. There were factories in Manchester which were supplied in this way, and where, consequently, there was no need for either gas or steam engines. The result was beneficial to the proprietors of these establishments, and also to the Corporation and the ratepayers.

The report was adopted.

Local Government Board Inquiry—Extensions of the Gas and Electricity Works.

On Thursday, Mr. RIENZI WALTON held an inquiry at the Town Hall, concerning the applications of the Corporation to the Local Government Board for permission to borrow £250,000 for their gas undertaking, and £100,000 for electric lighting purposes.

The DEPUTY TOWN CLERK (Mr. Hudson), in opening the case, first dealt with the amount required for the Gas Department. He said that by their Provisional Order of 1893 power was given to the Corporation to borrow £500,000 for gas-works purposes; and in March, 1894, they received sanction to the borrowing of one-half of the amount. The present application was, practically, for the balance of the £500,000. On the last occasion, the Corporation pressed the Board to give them terms somewhat analogous to those which they had previously had in connection with gas loans—viz., repayment in 50 or 55 years; but the 1894 loan was fixed for repayment in 30 years. It was thought that when the Inspector came to examine the details of the items of expenditure in the present application, he would probably say that a somewhat longer period ought to be allowed. There was not much land in the present case; but there were large sums to be expended in buildings of a permanent character.

Alderman *Higginbottom*, the Deputy Chairman of the Gas Committee, said he had been closely identified with all matters relating to the various undertakings of the department during the past six years; and, as an engineer, he had given special attention to all the mechanical appliances in connection therewith. The works for which the former £250,000 was borrowed were now nearly all completed; and to keep pace with the increased demand for gas, it had become necessary to further extend the plant and mains. Although the demand which had arisen from the use of the electric light in the centre of the city had been very great, and was still advancing, the normal increase in the gas consumption continued. The increase in 1895 was 4·28 per cent., owing to a very severe winter; and in 1896, it was 2·16 per cent. Since March this year, it had been at the rate of 4·66 per cent. The demand for prepayment meters was so great that they were being sent out and fixed at the rate of 800 to 1000 per month. The quantity of coal and cannel carbonized in 1895-6 was 375,514 tons—an increase of 10,619 tons over the previous year; and the average illuminating power of the gas was 19·55 candles. The storage capacity of the works had never yet been equal to the manufacturing capacity. When the new holder was ready (which would be shortly) at Bradford Road, this difficulty would have been overcome; and a margin of about 5½ million cubic feet per day would be available. New plant was proposed to be put down during the next three years, for which the money was now sought, to equalize the storage and the manufacturing capacity and the necessary distributing mains. The gross profit of the year was £88,063. After paying interest £31,049, and sinking fund £17,734, the net profit was £39,279, all of which had been paid to the city fund during the year in aid of the rates. The whole of the works and plant had been kept in a state of thorough repair out of revenue; the amount expended in 1896 being £17,599, or for the past three years £63,924.

Mr. *G. E. Stevenson*, the Gas Engineer to the Corporation, explained how the money would be spent. At the Bradford Road works £166,366 was required; this including the cost of fitting up a plant for the manufacture of carburetted water gas, and the laying out of a new section of the works. In his opinion, it was necessary that all the works for which the money was required should be executed so as to meet the growing demand of the next three years. The average increase in consumption in the past ten years had been about 2½ per cent. per annum; and the increase had been at a rather higher rate during later years.

Mr. *W. C. Waddington*, the Superintendent of the distributing plant, was called; and Mr. *Thackray*, from the Treasurer's office, gave formal evidence as to the indebtedness and borrowing powers of the city.

Mr. *Corbet Woodall* gave evidence as to the proposed installation of carburetted water-gas plant. One great advantage of this apparatus was that it could be put into working order in four hours; so that it was readily available for meeting any heavy demand for gas such as arose during foggy weather. There was slightly more carbonic oxide in carburetted water gas than in ordinary coal gas; but the idea that its use was attended with danger had been completely exploded.

Alderman *Higginbottom* (recalled) stated that during the last few winters they had got to the end of their tether in the matter of gas supply on foggy days. On one occasion in 1895, with a full day's supply at all the works, they were within twenty minutes of darkness; and they had to send the gas through the mains unpurified. The gas-engines in the city had to be stopped, to the great annoyance of their owners, and to the loss of the ratepayers. If they had had the water-gas plant then, this difficulty would have been overcome.

The DEPUTY TOWN CLERK next referred to the application for a loan for electric light extensions. He said the Board had already sanctioned £80,000 in 1892, £70,000 in 1893, and £100,000 last year. The demand, however, had grown very rapidly. The present application for £100,000 was rendered necessary owing to the fact that the still increasing demand had caused the capital outlay to be greater than was anticipated. As the area of supply had now been extended to the whole city, the plant would require to be increased accordingly.

Alderman *Higginbottom*, the Chairman of the Electric Light Sub-Committee, said the demand for current was so considerable that it was absolutely necessary to increase the plant and mains. In 1893, the number of consumers was 82; and by June this year it had increased to 1216. The number of lamps in 1893 was 8000; and in June, 1896, 109,636. About 7100 lamps were still waiting to be connected for the supply of 33 consumers, which would make a total of 116,700 lamps.

Even with the proposed extensions, the capacity of the station was only equal to 136,000 lamps, so that merely 19,300 lamps had to be added to overtake the capacity of the works. The Board of Trade had given their consent to the district of supply being extended to the whole area of the city—a distance north to south of 7⅛ miles, and east to west of 5 miles, or 20¼ square miles. It was evident that at an early date large extensions, or else a new station upon another site, would have to be undertaken.

Other evidence having been given, the Inspector visited the various stations at which the works are proposed to be carried out.

THE DISPOSAL OF THE TAR FROM THE SALFORD CORPORATION GAS-WORKS.

At last Wednesday's Meeting of the Salford Town Council, the Gas Committee submitted a report, recommending the acceptance of the offer of Mr. J. E. C. Lord to purchase the tar manufactured at the several gas-works for a term of seven years at the market price ruling from time to time.

Mr. HOLLAND, in moving the adoption of the report, explained that hitherto it had been the custom of the Committee to advertise in the usual way for contracts for the purchase of the tar, with the very unsatisfactory result that only three or four tenders had been received on each occasion. Moreover, it was a matter of some significance that one particular firm invariably secured the contract. He made no charge against any man in any sense or form. He simply suggested that the Council would very likely see the value of substituting some other system; and that was what the Committee were now suggesting. The proposal in effect was that in future a contract should be arranged without resorting to competition, and that the price should be regulated each month by current rates in the open market. In 1893, 10s. per ton was the highest offer they had for tar; in 1894, it was 15s.; and last year, with a new man in competition, the price jumped up to 21s. 9d. So that, by the introduction of a little fresh blood, the ratepayers were made richer to the extent of £2000 over previous years. Since the new system began to be considered, the Committee had actually had an offer of 26s. per ton. That was in May; and a month later, the same firm made a further offer—£600 or £700 in advance of the first one. This was an enormous jump—more than 250 per cent. above the offer of the same firm in 1893. It seems to him to have been made with the object of winning the Council away from the proposal now submitted by the Committee; and he hoped it would not have such an effect. All that the Committee desired was to have the proper market price for the tar; and under the suggested arrangement, this end would be secured.

Mr. PHILLIPS seconded the resolution, and said that in the last seven years the Corporation would have had from £10,000 to £20,000 more for the tar had it been in the same position with regard to the sale as towns like Nottingham, Leicester, Bolton, Oldham, Sheffield, and Liverpool.

Alderman MANDLEY opposed the proposal on the ground that it involved a departure from a very salutary standing order—viz., that all contracts should be advertised and offered to public competition. Was it not a fact, he asked, that Messrs. Hardman and Holden had offered to contract for the tar for a year at the rate of 30s. a ton?

Mr. HAMBLETT thought the Council ought to be in possession of the terms of the report on which the Committee had acted.

The TOWN CLERK read the report, which merely gave in greater detail the particulars already explained by Mr. Holland.

The motion was adopted.

SELBY GAS SUPPLY.

Annual Reports on the Gas Department.

At the last Meeting of the Selby District Council, the Chairman of the Gas Committee (Mr. M. Scott) presented their report for the year ending March 31. In moving its adoption, he said that the working expenses, everything included, came to £2905; and the income from all sources was £4210—leaving a profit balance of £1305. Added to this there was the credit balance on March 31, 1895, amounting to £64, which gave them £1369 to pay off the instalment of the loan of £1455, comprising £645 as interest and £810 as principal. This left them financially owing £810 less on the principal than they did on March 31, 1895. He proposed, as speedily as possible, to present a further interesting financial statement in regard to the gas-works, showing its sound and healthy condition as a property, after writing off a very large sum for depreciation arising from wear and tear. It would be unfair to close the report without saying that the Council had in their Gas Manager (Mr. M. Dunn) a thoroughly capable, painstaking, and industrious officer; and to his abilities and zeal were owing very largely the success of the undertaking. The report was adopted.

Subsequently, Mr. Dunn's annual report was read. He stated that during the year 1895-6 the quantity of gas made was 26,307,200 cubic feet, which was an increase on the previous year of 3,236,200 cubic feet, or equal to about 14·03 per cent. The gas sold amounted to 24,333,700 cubic feet; while 1,973,500 cubic feet were unaccounted for. There were 2395 tons of coal carbonized, together with 45 tons of cannel—making a total of 2440 tons. In the year 1894-5, the quantity was 2153 tons. The increase was 287 tons, or equal to 13·33 per cent. The average make of gas per ton of coal carbonized was 10,781 cubic feet; gas sold, 9973 cubic feet, as against 10,060 cubic feet in 1894-5—a decrease of 87 feet per ton. The coke sold was 911 tons, which realized £413 2s. 8d., or 9s. 0⅔d. per ton, as against 12s. per ton last year; coke sold per ton of coal carbonized, 8 cwt. 1 qr. The total quantity of tar sold amounted to 190 tons, which produced £202 19s. 7d.; and 30 tons were still in stock. The illuminating power of the gas for the year was 18 candles, as against 17·36 candles before. The price was 3s. 3d. per 1000 cubic feet during the quarter ending June, 1895—prepayment meter consumers being supplied at the rate of 20 cubic feet for 1d. During the quarters ending September and December, 1895, and March 31, 1896, it was sold at 3s.; giving 25 feet for 1d. by prepayment meters. The total make of gas was much above that of the preceding year, and had the past winter approached in severity an average one, the make would have exceeded 30 millions.

SALES OF SHARES.

At the Mart, Tokenhouse Yard, on Monday last week, Mr. Alfred Richards conducted a successful sale of stocks, shares, and debentures of gas and water companies. The first parcel offered consisted of 70 £10 "D" preference shares (6 per cent.) in the Aldershot Gas and Water Company; and the greater number of them were bought for £18 2s. 6d. each—ten, however, fetching £18 7s. 6d. each, and six £18 12s. 6d. apiece. Ten fully-paid ordinary shares, of the same nominal value, were sold at £28 5s. per share. Some 4½ per cent. perpetual debenture stock of the Commercial Gas Company, with the interest accruing thereon from Jan. 1 last, was knocked down at the rate of £158 10s. per cent. A parcel of 5 per cent. perpetual debenture stock of the Wandsworth and Putney Gas Company, with interest as from the 1st inst., was disposed of at the rate of £167 10s. per cent. Some 10 per cent. shares in the Lambeth Water Company, the last dividend on which was at the rate of 7½ per cent. per annum, were purchased at the rate of £268 per £100. The Great Yarmouth Water Company's 4 per cent. perpetual debenture stock fetched £128 per cent. Some 4 per cent. mortgage debenture bonds of the Kingston-on-Thames Gas Company were knocked down at £110 per £100; three £50 fully-paid 10 per cent. shares fetching £130 each, and two ordinary 7½ per cent. shares £92 10s. apiece. A number of £10 shares in the Lowestoft Water, Gas, and Market Company, ranking for a maximum dividend of 10 per cent., but the last dividend on which was at the rate of 7½ per cent. per annum, were all sold at £21 12s. 6d. per share; some £10 additional shares (last dividend 5½ per cent. per annum) fetching £15 15s. each. Some original stock of the Hornsey Gas Company, bearing 10 per cent. dividend, was sold at the rate of £280 per £100; additional capital stock (7 per cent.) realizing £190 per £100. Two £25 "A" shares in the Dorking Gas Company fetched £63 10s. each; five £25 "B" shares, £63 each; five £25 "C" shares (£15 paid), £32 5s. each; and some 5 per cent. perpetual debenture stock was sold at the rate of £151 per cent.

Last Wednesday, £5 fully-paid shares in the Petersfield Gas Company, Limited, paying a dividend of 6 per cent., realized £7 each for 52 and £6 17s. 6d. for 15. A number of fully-paid £25 original shares in the Winchester Water and Gas Company were sold locally at an average of £63 11s. each, as compared with £62 each obtained for similar shares at a recent sale. At a sale last Tuesday of 5 per cent. preference stock in the Newcastle and Gateshead Water Company good prices were realized. The stock, to the nominal value of £23,400, produced £40,234, or an average of £171 10s.

ELECTRIC LIGHTING NOTES.

The Board of Trade have issued their report respecting their proceedings under the Electric Lighting Acts during the past year. Applications for Provisional Orders were received from 25 Local Authorities and 13 Companies—three of them relating to London. Of the total number of Orders applied for, 30 were granted—or rather 31, for, in the case of the application in regard to South London, two Orders, covering the districts of Camberwell and St. Saviour's, Southwark, were made. In the other cases, the applications were either refused or not proceeded with. Four applications for Licences were received—one being from the Corporation of Bangor. Representations were made by ratepayers, objecting to the application; and the Board of Trade directed a local inquiry to be held. After due consideration of their Inspector's report, they refused to proceed with the matter. The three other cases are still under consideration. Appended to the report is a list of the Provisional Orders confirmed by Parliament prior to the present session, and of the Licences granted by the Board of Trade since the passing of the Electric Lighting Act, 1882; showing those which have since been revoked or repealed.

The Oldham Corporation Electric Lighting Committee are proposing to spend nearly £10,000 upon the enlargement of their works; and to the borrowing of this sum, they desire the sanction of the Local Government Board.

The Hull Corporation Electric Lighting Committee have proposed that application be made by the Council to the Local Government Board for sanction to the borrowing of £42,000 for the purpose of extending the electric light installation in the borough.

Under the terms of the arrangement which has been already noticed in the "JOURNAL," the Liverpool Corporation last Wednesday took over the business of the Liverpool Electric Supply Company, which they have acquired at the cost of £400,000. The Corporation introduced a Bill in the present session to sanction the raising of the necessary capital for carrying out the scheme; and it received the Royal Assent on the 21st of May.

The opposition to the electric lighting scheme at Peterborough has prevailed; the Local Government Board having refused to grant the application for sanction to the borrowing of £20,000 for the works. The letter (dated the 30th ult.) in which the decision of the Board was communicated will perhaps be useful in deterring other authorities similarly circumstanced from persisting in a course to which the ratepayers have shown such pronounced aversion; and we therefore reproduce the main portion. It reads: "The Board learn that very strong opposition was offered to the proposed scheme on behalf of a large number of ratepayers; and upon the evidence submitted at the inquiry, they are of opinion that, while the scheme provides only for

the supply of energy within a limited area of the city, the cost of carrying it into effect would seriously diminish the resources of the Town Council under the Public Health Act, 1875, which should be available for meeting various urgent needs of special sanitary importance—such as, for example, the improvement of the water-works and the provision of an isolation hospital—and that, having regard to the present assessable value and indebtedness of the city, the proposed outlay upon works which are not designated to satisfy the sanitary requirements of the city, is open to much objection. Accordingly the Board are not prepared to sanction the proposed loan for electric lighting." The floating of a Company is now spoken of.

The Chatham and Rochester Electric Lighting Company are suffering from a lack of capital; and at the annual general meeting, held on the 30th ult., it seemed as if they lacked the shareholders' support also, as considerable difficulty was experienced in securing a quorum. When the proceedings did commence, the Chairman (Mr. H. Jasper) said the report was not favourable, and no dividends were available; this, in his opinion, being due to the discounts which had been allowed to their largest customers in order to retain them. Notwithstanding this, however, they had lost two of their largest consumers, and three others had been taken from them. This was important, for he was told that three consumers who had been enticed from them were to have a supply at 4d. per unit as against the 8d. of the Company, and be allowed a discount of 10 per cent. in the bargain. Then the incandescent gas-lamps had made a difference to the Company. He felt, however, that time would place their undertaking in a good and prosperous state. Mr. Hurrell, the Managing-Director, said the Chairman would not advance them any more money; and a London financier said it would be practically impossible to find anyone who would do so under present conditions. The Chairman said he had tried every shareholder, but he could not get any of them to put down a shilling; and London capitalists would not lend their aid at all. He then decided to spend a certain sum, which they knew he had done; and he was now prepared to make an offer with regard to New Brompton. It meant a capital outlay of £10,000; and if the authorities wished them to go farther, they could spend another £10,000. He was willing to take upon himself the responsibility of the first outlay, because he could not allow the interests of the Company to be jeopardized by no heed being paid to New Brompton requirements. When he had the plant down, and was supplying the current, he would ask the Company to allot him 200 of their £5 shares for him to carry out the scheme. After he had received a net profit of 6 per cent. on the working, he would divide any additional earnings between the Company and himself; and then ultimately, if the works were sold to the Gillingham authorities, he would take 75 per cent., and the Company 25 per cent. They would not find another man in England to do what he had done for the Company. Mr. Massey remarked that there was some ulterior motive in the offer. Mr. Wingent observed that the whole of the profit earned last year was £200, against £400 in the preceding year. That was not making any progress. Mr. Hurrell said that, under present conditions, they could not make progress. When they did get a customer, they took up the application with dread, as they had not a single penny of capital with which to put down plant. Mr. Wingent asked, if they followed that up, where were they going to? The Chairman said he warned the shareholders some time ago that he would not go on advancing money for the capital outlay. Mr. Massey said that so long as they paid 10 per cent. on this, the Company were not likely to get any capital. The Chairman asked Mr. Massey on what terms he would advance the money. On Mr. Massey demurring, he said this was where the pinch was. He had advanced £30,000, and had no guarantee of getting it back. There was his ground not paid for, his loan, and the interest on his capital; and still he was supposed to go on finding the money and singing. The Mayor of Chatham (Mr. Leavery) said it was a humiliating confession that the Company could not deal with the applications for the light; and he suggested that some of the property and assets should be reduced. They had now to provide the light at New Brompton, or lose their Provisional Order. The Chairman could not agree with writing down any of the capital. It was ultimately decided to appoint a Committee to consult with the Directors on the general affairs of the Company.

The appointment of Engineer and other officials for the management of the electric light undertaking which has now passed into the control of the Exeter Corporation has caused the body no little trouble. Having, in a hot fit in the previous week, decided not to take over the officers of the old Company, the City Council proceeded on the 29th ult. to reverse their decision. The position of the Electric Lighting Committee was exactly the same as on the previous occasion. As Mr. Wreford, their spokesman, put it, it was a mistake to "swop horses in crossing a stream." They did not believe that the proposed salary of £200 a year would induce a large number of up-to-date engineers to become candidates for the post; and supposing it did, who was going to advise the Council which was the better man? Mr. Munro, the Engineer for the Company, had the advantage of local knowledge; and at all events they could give him a trial, and see whether, under more advantageous conditions, he could not make the works a success. Several of the speakers who followed expressed regret at the tone of personal hostility towards Mr. Munro which characterized the discussion. This, however, did not prevent the opponents of the Committee's recommendation from pressing their point, that, as a large installation of new plant was required, an effort should be made to get the best man possible. On the other hand, it was urged that Mr. Munro was not responsible for the unfortunate turn which events had taken under the Company, and which had resulted in the sale for £7500 of plant which had cost £23,000. In the end, the resolutions directing that advertisements should be issued for an Engineer and a Secretary were rescinded. An attempt was then made to reduce the salary proposed to be paid to Mr. Munro, from £200 to £175 a year. But this failed; and a majority also rejected an amendment which sought to prevent the Committee from undertaking the installation and repair of electric fittings for customers. With reference to the proposed appointment of a Secretary, it was decided that this official should be described as a clerk, and that the selection of someone for the position, as well as the amount of the remuneration, should be determined later.

THE NEW WATER-WORKS FOR GLOUCESTER.

Turning on the Supply.

The new water-works which have been constructed at Newent for the city of Gloucester have been so far advanced that the supply was turned into the mains last Wednesday, with a ceremony befitting the occasion. The scheme has been described and its progress noted in the "JOURNAL" at various times. Its total cost was estimated at £42,000; and there is every indication that this will be more than sufficient, and that there will be from £4000 to £5000 surplus. On Wednesday, the city wore a very gay appearance; streamers and flags being stretched across the main streets. At two o'clock, the Mayor and City High Sheriff, wearing their chains of office, accompanied by the members of the Corporation, marched in procession to the Cross, where an immense crowd had assembled in each of the four streets. Here a hose attached to a stand-pipe on the new main was carried up a fire-escape; and his Worship, after making a few remarks as to the efforts of the Council to obtain a good supply, turned on the water, which was carried high above St. Michael's Tower, opposite which the fire-escape was placed. The pressure was subsequently tested from the roadway, and proved satisfactory. A public banquet, which was numerously attended, was afterwards held at the Guildhall. The Mayor, in responding to the toast of "The Corporation, and Success to the Water-Works Undertaking," referred to the anxiety which had been caused by the fear of another water famine in the city, and to the satisfaction the Corporation felt in knowing they now had an abundant, and, as they had reason to believe, a permanent supply. The contract provided that the works should be finished by October; but as the supply at the Witcomb reservoirs diminished week by week, temporary pumping machinery had been erected. By perseverance and hard work, favoured by the dry weather, they had been able to get the water from the new source into the mains that day; and for many years to come Gloucester was sure of an abundant supply of pure water. The Deputy-Mayor (Mr. A. Buchanan) gave "The Health of the Chairman," and presented him with a crystal jug and two beakers, mounted in silver, as a souvenir of the occasion, which presentation was suitably acknowledged by the Mayor.

LEEDS CORPORATION WATER SUPPLY.

The Extension of the Works.

On the proposition of Alderman Cooke, the Chairman of the Water Committee, the Leeds City Council, last Wednesday, agreed to apply to the Local Government Board for sanction to borrow £50,000 for water-works purposes. It was remarked by Alderman Cooke that the best possible proof of the increasing growth of the water-works in popularity and in profit was evidenced by the fact that the requirements were rapidly increasing. During the last financial year, the Committee received applications for 6000 new supplies of water—an increase of 388 as compared with the previous year. The £50,000 now proposed to be borrowed was a supplementary sum to the £100,000 which the Council last August asked for sanction to borrow for extensions, including the enlargement and reconstruction of the Eccup embankment, new works and undertakings, including the new pipe-line from Arthington to Eccup, the new 30-inch main from Washburn to Arthington, the new service reservoir at Harehills (a much-needed work, which the Committee were now able to proceed with, the difficulties having been removed by the action of the Local Government Board, and the cost of which would be £30,500), new engines and boilers for the Headingley pumping-station, and other requirements. Alderman Cooke also intimated that he hoped to be able next month to make a gratifying statement as to the profits on the water-works.

The Purchase of the Sandwich Gas-Works.—Mr. C. A. Cripps, Q.C., M.P., the Umpire chosen to decide as to the terms on which the Sandwich Town Council should acquire the undertaking of the Sandwich Gas Company, has made his award. He has settled the price to be paid at £4600.

De Mare Incandescent Gas-Light System, Limited.—A meeting of shareholders in this Company was held last Friday, at the Westminster Palace Hotel, and adjourned for a fortnight, in order to give the Directors time to consider certain proposals which had been submitted to them with regard to the future of the undertaking.

Proposed Public Gas Examiner for Middlesex.—The Middlesex County Council, at their last meeting, had before them a report by the General Purposes Committee dealing with memorials from the Hampton Wick, Twickenham, and Chiswick District Councils as to the expediency of appointing a public gas examiner for the county. The memorialists submitted that, if gas companies were obliged to provide testing-places and apparatus in the district of every sanitary authority, such places to be open at all times to the public without the necessity of first giving notice to the Gas Company of an intention to test the gas, the public would be more satisfied than they are at present, complaints would be considerably less, and a better average of quality and purity in the gas would be secured. The memorials further asked that the County Council would give the matter their consideration; that, in any future legislation affecting gas companies, a clause should be inserted giving effect to the suggestion contained in the memorials; and that such other steps shall be taken as may appear to the County Council to be expedient. The Committee recommended that an intimation should be given to the Councils memorializing that the County Council were not prepared to take any action with reference to the appointment of a gas examiner, with the suggestion that the District Councils should combine among themselves with a view to the appointment of a joint gas examiner. Mr. Green proposed that the memorials should be referred to the Parliamentary Committee for consideration at any time in view of future legislation. He thought this would be better than committing them to the archives of the Council. This was agreed to.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

"Stands Scotland where it did?" I am tempted to put the old question in a new light, by the conclusion which has been forced upon me, on perusing the reports in the "JOURNAL" of the meetings of the Incorporated Institution of Gas Engineers and the Incorporated Gas Institute, that Scotch gas managers were sadly out of the business, as ordinary members. It cannot be said that either of the bodies was neglectful of Scotland; for in the one Mr. W. Foulis, of Glasgow, was the incoming President, and in the other Mr. R. Mitchell, of Edinburgh, was the outgoing President. This was, however, the only connection which Scotch gas managers had with the meetings of the two national technical bodies. No one else said or did any one thing. The only gentlemen hailing from Scotland—with the exception of perhaps one or two who were Scotchmen by birth, but are now stationed outside its borders—who took any part in the proceedings were Mr. D. Bruce Peebles and Dr. Stevenson Macadam, both of Edinburgh, who each spoke once at the Institute meeting. It would not be desirable that Scotchmen should monopolize, nor is it necessary that they should make themselves conspicuously prominent at, such meetings; but an entire absence must be accounted for in some way. Has interest in such businesses waned in these northern parts? or have Scotch gas managers fallen behind in the problems which are now being tackled by the leading intellects in the industry? To speak frankly, I think the latter may have something to do with it, but not the first. I would have been disposed to have sought some other explanation, and to have persuaded myself that, possibly on account of The Gas Institute having met in Edinburgh last year, Scotchmen may have thought they had done sufficient for the time being, in attendance at discussions upon high-class subjects. But on referring to the programme of business at the Edinburgh meeting, I find that Scotchmen did not take a foremost place when such subjects were under consideration; while, of the papers read, only one was by a Scotchman, and this was upon a subject of management, not of science. I do not believe there has been any decadence in any respect among Scotch gas managers. What I rather find is the rise of a severely scientific school—an "intense" inner circle—in whose hands a subject becomes at once academic, and beyond the range of ordinary minds; while, of the matters which may still be discussed from a practical standpoint, most are of so large an order that only managers who supply the biggest communities can be expected to have any experience with them. If this view should be correct, there is no room for regret that Scotchmen should find it unprofitable to attend such meetings as may be given up to this particular order of things; it is rather matter for congratulation. The academic outcrop has not done much for the gas industry; and the large gas-works questions, though they may interest all, can only be of paramount importance to a few. There is, in this state of matters, an advantage, in respect that greater scope is left for local associations. The North British Association meeting is only a few weeks distant now; and I trust that the members will make a good appearance at it—showing that they have as firm a grip as ever of all the subjects relating to their business, and that their absence from the London meetings does not denote anything more than is here outlined.

At the meeting of the Edinburgh and Leith Gas Commission on Monday, it was reported that there was an increased output of gas to the amount of 650,000 cubic feet during the month of May, as compared with the corresponding period of last year. But for the exceeding brightness of the weather, the increase would have been larger. Mr. Hunter moved that the principals of letters and documents be kept in a safe in the office of the Commissioners; and that, if necessary, copies should be kept in the office of the Clerk. The motion shows how much Mr. Hunter has to learn regarding the conducting of public business. The Clerk to a body like the Commissioners is not merely a person who can keep the minutes of their meetings; he is their legal adviser. In order that he may be able to give reliable advice, it is necessary that he should be in active practice; and consequently all such bodies have a Clerk whose office is his own, situated where it is convenient for his business. To compel him to transact all his duties as Clerk in the office of the Commission, would mean that the Commissioners would have to provide him with accommodation for his whole establishment, unless they were prepared to pay him for his exclusive services. The arrangement which the Commissioners have with Mr. Jack is the same as exists in every public body in the city, with the exception of the Town Clerkship. It works well in all cases; and there could be no question of changing it. To have required that the principals of documents should be kept in the Commissioners' office, and copies made for the Clerk's use, would have been an unnecessary expense. The Commissioners rejected the proposal by a large majority. Bailie Kinloch Anderson intimated that it had been resolved to introduce automatic prepayment meters into one and two roomed houses which are being erected, but that the step was an experimental one, and that in the meantime no existing meters would be taken out, to be replaced by prepayment ones. Provost Bennet, of Leith, being absent, the motion of which he had given notice, with reference to the Corporation of Edinburgh acquiring the Portobello Gas Company's undertaking, was delayed.

The shareholders of the Ayr Gas Company held their annual meeting on Wednesday. Mr. W. Smith's working for the year enabled the Directors to submit a highly favourable report, and that, too, notwithstanding competition with a Corporation electric lighting installation The total revenue amounted to £12,153, of which £10,425 was derived from sales of gas, and £1247 from residual products. The balance of profit was £2732, out of which £500 has been added to the reserve fund, raising it to £4500, and a dividend at the rate of 6 per cent., the same as last year, was paid. It was also reported that the works were in efficient order; and that the average illuminating power of the gas supplied during the year was 25·2 candles. The revenue from ordinary

GAS AND WATER COMPANIES' STOCK AND SHARE LIST (see ante, p. 14).

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	15 Apl.	10½	Alliance & Dublin 10 p. c.	25—26	..	4 0 9
100,000	10	„	7½	Do. 7 p. c.	17—18	..	4 3 4
300,000	100	1 July	5	Australian (Sydney) 5% Deb.	108—110*	+½	4 10 11
200,000	10	12 June	5	Belgrano (B. Ayres), Limited	9½—10½	+½	4 15 3
100,000	Stck.	26 June	5	Do. 5 p. c. Deb. Stk	100—103*	..	4 17 1
200,000	5	29 May	6½	Bombay, Limited	7½—7¾	..	4 3 10
40,000	5	„	6½	Do. New, £4 paid	5½—6	..	4 6 8
380,000	Stck.	27 Feb.	12	Brentford Consolidated	290—295	..	4 1 4
210,000	„	„	9	Do. New	220—225	..	4 0 0
50,000	„	„	5	Do. 5 p. c. Pref.	—	..	—
159,375	„	12 June	4	Do. 4 p. c. Deb. Stock.	130—134	..	2 19 9
220,000	Stck.	27 Mar.	11	Brighton & Hove Original	237—242	..	4 10 11
208,820	„	„	8	Do. A Ord. Stk.	190—195	..	4 2 0
933,500	Stck.	27 Feb.	5	Bristol, 5 p.c. max.	127—132	..	3 15 9
420,000	20	27 Mar.	11¼	British	56½—57½	..	3 18 3
50,000	10	12 Mar.	11¼	Bromley, Ordinary 10 p. c.	22½—23½	..	4 17 11
71,000	10	„	8½	Do. 7 p. c.	19—20	..	4 5 0
500,000	10	29 Apl.	5	Buenos Ayres (New) Limited	9¾—10½	..	4 15 3
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	103—105	..	5 14 3
150,000	20	27 Feb.	8½	Cagliari, Limited	29—31	..	5 6 5
100,000	10	29 May	8	Cape Town & District, Ltd.	17—18	..	4 8 11
50,000	50	2 May	6	Do. 6 p. c. 1st Mort.	58—60	..	5 0 0
550,000	Stck.	15 Apl.	13½	Commercial Old Stock	342—347	..	3 17 8
165,000	„	„	10½	Do. New do.	258—263	..	2 19 10
165,000	„	12 June	4½	Do. 4½ p. c. Deb. do.	146—150	..	3 0 0
800,000	Stck	12 June	13	Continental Union, Limited.	285—290	..	4 9 8
200,000	„	„	10	Do. 7 p. c. Pref.	217—222	..	4 10 1
51,600	Stck.	27 Feb.	14	Croydon Com'cial A 10 p. c.	—	..	—
157,500	„	„	11	Do. B 7 p. c.	—	..	—
535,000	Stck.	27 Feb.	5½	Crystal Palace Ord. 5 p.c. Stk	135—140	..	3 15 0
60,000	„	„	5	Do. 5 p. c. Pref.	—	..	—
486,090	10	30 Jan.	11	European, Limited	27—28	+½	3 18 6
354,060	10	„	11	Do. £7 10s. paid	18—19	+½	4 6 11
5,746,590	Stck.	13 Feb.	12½	Gaslight & Coke, A, Ordinary	314—319	+2½	3 19 11
100,000	„	„	4	Do. B, 4 p. c. max.	108—113	..	3 10 9
665,000	„	„	10	Do. C, D, & E, 10 p.c. Pf.	297—302	..	3 6 3
30,000	„	„	5	Do. F, 5 p. c. Prf.	145—150	..	3 6 8
60,000	„	„	7½	Do. G, 7½ p. c. do.	210—215	..	3 9 9
1,300,000	„	„	7	Do. H, 7 p. c. max.	205—210	..	3 6 8
463,000	„	„	10	Do. J, 10 p. c. Prf.	295—300	..	3 6 8
476,000	„	„	6	Do. K, 6 p. c. Prf.	172—177	..	3 7 10
1,061,150	„	12 June	4	Do. 4 p. c. Deb. Stk.	138—143	..	2 15 11
294,850	„	„	4½	Do. 4½ p. c. do.	148—153	..	2 18 9
908,000	„	„	6	Do. 6 p. c. do.	205—209	..	2 17 5
70,000	10	14 May	6	Hongkong & China, Limited	12½—13½	..	4 8 10
3,800,000	Stck.	14 May	12	Imperial Continental.	251—256	+3½	4 13 9
376,400	100	1 Feb.	4	Do. 4 p. c. Debs. Red.	100—103	..	3 17 8
473,600	Stck.	13 Feb.	3½	Do. 3½ p. c. Deb. Stk „	109—111	..	3 3 1

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
75,000	5	26 June	6	Malta & Mediterranean, Ltd.	6—6½*	..	4 12 4
560,000	100	Apl.	5	Met. of Melbourne, 5 p. c. Deb.	115—118	..	4 4 10
250,000	100	„	4½	Do. 4½ p. c. Debs.	110—112	..	4 0 4
541,920	20	12 June	5	Monte Video, Limited	16½—17½	..	5 14 3
150,000	5	29 May	8	Oriental, Limited	8¼—8¾	..	4 11 5
135,000	5	„	8	Do. New, £4 10s. paid	7½—7¾	..	4 12 10
15,000	5	„	8	Do. do. 1879, £1 paid	1—2	..	4 0 0
60,000	5	12 Mar.	7	Ottoman, Limited	5—5½	..	6 7 3
166,870	10	—	2	Para, Limited	1¼—1½	..	—
420,000	100	2 Nov.	6	People's Gas } 1st Mtg. Bds.	105—110	..	5 9 1
500,000	100	1 June	6	of Chicago } 2nd Do.	102—107	..	5 12 1
250,000	10	27 Mar.	8	San Paulo, Limited	13—14	..	5 14 3
500,000	Stck.	13 Feb.	15½	South Metropolitan, A Stock	405—415	..	3 14 8
1,350,000	„	„	12	Do. B do.	315—320	..	3 15 0
310,000	„	„	13	Do. C do.	337—342	..	3 16 0
800,000	„	16 Jan.	5	Do. 5 p. c. Deb. Stk.	175—178	..	2 16 2
60,000	Stck.	12 Mar.	11½	Tottenham & Edmonton, A	250—255	..	4 10 2
60,900	„	„	8½	Do. B	—	..	—
170,380	10	29 May	10	Tuscan, Limited.	13¼—14½	..	6 18 0
149,900	10	1 July	5	Do. 5 p. c. Debs. Red.	98—100*	+½	5 0 0

WATER COMPANIES.

746,123	Stck.	26 June	10½	Chelsea, Ordinary	343—348*	..	2 18 11
150,000	,	„	5	Do. 5 p. c. Pref.	170—175*	..	2 17 1
160,000	,	„	4½	Do. 4½ p. c. Pref. Stk., 1875	—	..	—
175,785	„	27 Mar.	4½	Do. 4½ p. c. Deb. Stock	158—163	..	2 15 2
1,719,514	Stck.	15 Apl.	7	East London, Ordinary	241—246	−2	2 16 11
654,740	„	26 June	4½	Do. 4½ p. c. Deb. Stk.	156—159*	..	2 16 7
100,000	„	„	3	Do. 3 p. c. Deb. Stk.	104—106*	..	2 16 7
700,000	50	12 June	7½	Grand Junction, 10 p.c. max.	125—130	..	2 17 8
280,000	Stck.	27 Mar.	4	Do. 4 p. c. Deb. Stk.	149—153	..	2 12 4
708,000	Stck.	13 Feb.	12	Kent	352—357	+4	3 7 3
160,000	„	„	7	Do. New, 7 p. c. max.	215—220	..	3 3 7
1,043,800	100	26 June	7½	Lambeth, 10 p. c. max.	270—275*	−1	2 14 6
406,200	100	„	7½	Do. 7½ p. c. max.	227—230*	..	3 5 2
350,000	Stck.	27 Mar.	4	Do. 4 p. c. Deb. Stk.	147—152	..	2 12 8
500,000	100	13 Feb.	12¾	New River, New Shares	437—442	+2	2 17 9
1,000,000	Stck.	30 Jan.	4	Do. 4 p. c. Deb. Stk.	157—160	+2	2 10 0
902,300	Stck.	12 June	4	S'thwk & V'xhall, Ordinary	160—165	−5	2 8 6
126,500	100	„	4	Do. Do. 7½ p. c. Max.	153—163	..	2 9 1
489,200	Stck.	„	5	Do. Do. 5 p. c. Pref.	165—170	..	2 18 10
1,019,585	„	15 Apl.	4	Do. 4 p. c. A Deb. Stk.	147—152	..	2 12 8
1,155,066	Stck.	12 June	10	West Middlesex	322—327	..	3 1 2
200,000	„	„	4½	Do. 4½ p. c. Deb. Stk.	155—160	..	2 16 3

*Ex div.

consumers had not only been maintained, but increased; while a new source of revenue had been found in the return from gas-stoves. The Chairman (Mr. Charles G. Shaw) said that some thought the continued prosperity of the Company might have warranted an increased dividend; but a majority of the Directors were of opinion that they should further safeguard the interest of the shareholders, in view of competition with another illuminant, by making a further addition to the reserve.

Mr. J. M'Gilchrist, of Dumbarton, has been appointed by the Stirling Town Council to make a valuation of the Stirling Gas Company's works, as one of the steps in the proposed transfer of the undertaking to the Corporation.

The sixty-first annual report of the Directors of the Galashiels Gas Company, which is to be submitted to the shareholders' meeting on Tuesday, states that the profit for the year is £2100, which, with the balance from last year of £6034, makes the receipts £8135. It is proposed to pay from this a dividend of 10 per cent., absorbing £2100; and to carry forward the balance of £6035. The quantity of gas sold during the year was 53,773,096 cubic feet—an increase on the year of 395,369 feet. The price is to be continued at 3s. 4d. per 1000 feet.

The Hawick Gas Company held their annual meeting yesterday. The Directors' report stated that the quantity of gas sold during the year was 45,365,300 cubic feet; and it recommended that the price of gas should be continued at 3s. 6½d. per 1000 feet. The Chairman (Mr. Thomas Laidlaw) said they had been able to come to an amicable agreement with the Town Council as to the use of the streets for laying their pipes. Their profits for the year were £98 more than in the preceding year, and £136 more than sufficient to pay the dividend. They had bought the coal required for the current year at from 6d. to 1s. per ton less than last year. Lime, tar, &c., had realized £88 more; but taxes, &c., had cost them £110 more. They had made about 3 million cubic feet more gas than in the year before. Their gas had been kept up to the high standard of 28 candles; and the Manager (Mr. J. Smith) had strict instructions not to allow it at any time to fall below this. Their works were in good order; and he considered the position of the Company was much better than last year. If trade improved, they might reasonably expect to be able to reduce the price of gas next year. In some shape or form, oil might be introduced, as the Edinburgh and Leith Corporation were doing; but they would act cautiously, as they had hitherto done. It was fortunate they did not follow the lead of some of their friends, and entertain the oil-gas process, as, in his opinion, it had been found wanting in many important points. The shareholders sanctioned the increase of the Directors' remuneration from £50 to £100. It was a pity that an otherwise excellent address should have been marred by the expression of the feeling of thankfulness that they were not as other people in the matter of oil gas. I am not aware of any important point on which oil gas has been found wanting. The only drawback which can be urged against it is that the price of cannel has been so reduced that it is not now so profitable as it was when first introduced; but this is an effect of the use of the process. The Hawick Company are therefore benefiting to some extent by the introduction of the oil-gas process in other places; and instead of attempting to pick holes in it, it seems to me that they ought rather to sing its praises.

The Motherwell Gas Company last year earned a revenue of £7529; and, with an expenditure of £4822, they had a surplus of £2757. The price of gas has been reduced from 3s. 6d. to 2s. 11d. per 1000 cubic feet; and it has been agreed to give a further discount of 2½ per cent. to consumers of two million cubic feet and upwards. A dividend at the rate of 10 per cent. has been paid. The capital of the Company is being raised from £22,767 to £25,000, to meet the cost of extensions to the works.

The Auchterarder Gaslight Company have paid a dividend at the rate of 8 per cent., set aside £100 towards reducing the debt of the Company, and reduced the price of gas by 5d. per 1000 cubic feet, making it now 6s. 3d.

It is reported from Arbroath that it has been resolved to reduce the price of gas by 2½d. per 1000 cubic feet; and that, in addition, the estimates will allow of the Gas Corporation contributing £250 towards the extinction of the bond over the harbour works, which was iniquitously put to some extent on the gas profits.

The old subject of the rating of underground gas and water works, by rural local authorities, is being again stirred up by the Dundee Corporation, who are endeavouring to obtain a classification of the rate, to the effect that the assessable value should be fixed at one-fourth of the real value. The Corporation of Aberdeen are in sympathy with the movement, and others are expected to follow, as is indeed likely when it is considered that the most remote moorland parish is, under the present system, entitled to share according to the mileage of the pipes within the parish, at the same rate as do those parishes where land value is high. It was expected that the question would be dealt with in the Agricultural Land Rating Bill for Scotland, which has just been introduced by the Lord Advocate; but I fail to see any reference to the subject in the Bill. It was mentioned in the Dundee Corporation on Thursday, and was sent to the Lord Provost's Committee for consideration.

The Water Department of the Dundee Corporation had last year a revenue of £50,591, which was £1508 above the estimate. The expenditure amounted to £49,195, which was £730 more than the estimate. There was thus a surplus on the year of £1396; but as there was a deficiency of £491 from the previous year, the free surplus was reduced to £905. The revenue was £2287 higher than for the preceding year; and of this upwards of £1500 was due to supplies by meter. There was a capital expenditure during the year of £3668; and a sum of £5997 was placed to sinking fund, and was applied in the reduction of debt. The estimates for the current year, which were before the Town Council on Thursday, showed an expenditure of £50,415, and a revenue of £50,534—leaving a surplus of £119. The estimates were approved. The domestic rate is fixed at a reduction of 1d. per pound upon last year.

NEW "PENNY-IN-THE-SLOT" COOKERS.

Arranged specially for Prepayment Meters.

We have given particular attention to the strength and simplicity of these Cookers, which are constructed upon the principle of our celebrated "Eureka" Cooker, and are practically indestructible. They are very easily cleaned, and are all constructed in as many parts as possible, so that, in case of breakage, the parts may be readily and cheaply replaced.

No. 403 and 404.

No.	External Dimensions.			Oven.			Hot Plate.	No. of Boiling-Burners	Price.	White Enamelled Crown extra.
	High.	Wide.	Deep.	High.	Wide.	Deep.				
401	18½	13½	11½	14	11	9½	13½ by 11½	1	28/6	—
402	24½	15½	15	18	11	11	15½ ,, 15	2	40/-	2/6
403	30	18	17	19	11	11	18 ,, 17	2	45/-	2/6
404	30	18	17	19	13½	11	18 ,, 17	2	50/-	2/6
404	If fitted with Enamelled-Lined and Jacketted Door and Fire-Brick Crown, as adopted by The London Gaslight and Coke Co.								55/-	2/6

Any of these Cookers, except No. 401, can be fitted with Griller at an extra charge of 2/6; but the adoption of the Griller is not recommended for use with Prepayment Meters.

JOHN WRIGHT & CO., LIMITED,

The Oldest and Largest Gas-Stove Manufacturers in the World,

ESSEX WORKS, BIRMINGHAM, and 105, CHEAPSIDE, LONDON.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *July* 4.

Sulphate of Ammonia.—At the close of June, there was rather more buying—resulting in an advance of about 2s. 6d. per ton at Leith, but not appreciably affecting other ports. July has, however, opened quietly; and any improvement at the beginning of the week has been lost—quotations being £7 18s. 9d. per ton f.o.b. Hull and Leith; and £8 2s. 6d. per ton f.o.b. Liverpool. The bulk of the demand has been for filling speculative contracts; consumers' direct orders being singularly scarce. Scotch makers continue to offer July-September delivery at £8 2s. 6d. per ton; and October-June at £8 10s. But orders in the forward position are being taken by speculators at below these prices; and this action has no doubt had its effect in deterring buyers from operating for prompt and early delivery.

Nitrate of Soda.—There has been a further falling off in deliveries during June, so that the total consumption, United Kingdom and Continent, in the six months has only been about 50,000 tons in excess of that of the same period of 1895; whereas in the early spring months, the excess promised to be not much short of 100,000 tons. The visible supply at the end of June, United Kingdom and Continent, was about 380,000 tons, against 290,000 tons at the end of June, 1895, and 250,000 tons at the end of June, 1894. It should, however, be remembered that production and shipment must be much curtailed during the next nine months in order to bring the total shipments, April, 1896, to March, 1897, within the total quantity agreed upon by the Combination. But if the visible supply be added to the balance still to be shipped before the end of March next, and assuming a consumption upon the same scale as that of the past twelve months, there will be a surplus of not much short of 100,000 tons. Should, however, there be an increase in consumption equal to that of the past twelve months, the consequent smaller surplus will be easily carried forward. Meantime, the market is quiet. On spot, good quality may be had at 7s. 9d. per cwt., and refined at 7s. 10½d per cwt. Due cargoes, ordinary quality, are worth about 7s. 9d. per cwt.; autumn shipments, 8s. 3d. to 8s. 4½d. per cwt., according to position.

LONDON, *July* 4.

Tar Products.—The demand for naphthalene continues good. This is a great relief to tar distillers, who, for many years, have had much difficulty in disposing of this objectionable product. Benzols are fairly firm; but buyers are halting at the advanced prices asked by makers. Some sales of outside anthracene are being made below the Committee prices. But the position generally is strong; and it is quite certain that the Committee will not reduce the price of their anthracene, no matter what the machinations of operators may be. Fortunately, stocks are largely reduced; and makers are quite easy as to the immediate future. Pitch is not eagerly sought after, and business for next season is doubtful, though makers are standing out for full prices. No contracts of importance have been made.

Values obtaining during the week are: Tar, 19s. to 25s. Pitch, 32s. 6d. nominal. Benzols, 90's, 2s. 9d.; 50's, 2s. 3d. Toluol, 2s. Solvent naphtha, 1s. 3d. Crude, 30 per cent., naphtha, 11d. Creosote, liquid, 2d.; ordinary, 1½d. Naphthalene, pressed, £3; salts, 35s. Cresylic acid, 1s. Carbolic 60's, 2s. Anthracene, "A quality," 11d.; "B," 8d. to 9d.

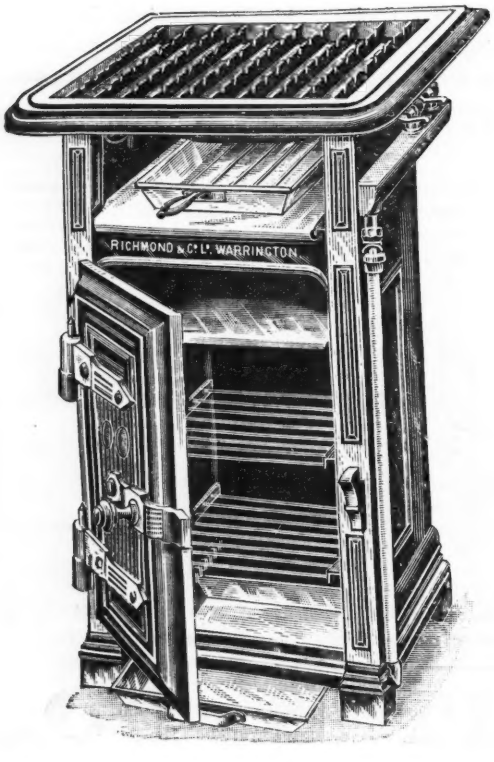
Sulphate of Ammonia is moderately steady. There is, however very little inquiry for futures, though makers would not accept anything like present price for forward contracts. Sulphate has sunk to a miserable condition, when its nitrogen value is contrasted with that of nitrate of soda. To-day's price at all ports is, roundly speaking, £8 per ton, less 3½ per cent. discount; while gas liquor is nominally quoted 6s. 6d. to 7s.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—No further important contracts for gas coal have been placed in this district since my last report; but one or two special lots have been bought by the Manchester and Salford Corporations, where they were offered outside regular contracts. There is a good deal of complaining, as was the case last year, of the delay by the corporations in deciding upon the tenders sent in for gas coal contracts, as it tends to deter colliery representatives from tendering for other contracts, until they know if the quantities they have already offered are likely to be accepted. With regard to prices this year, they would in some cases seem to be ruling even lower than previously reported; and reductions of 6d. per ton on last season's rates are not at all uncommon. It is still difficult to get at any really definite basis; but 6s. to 6s. 3d. per ton are prices at which common qualities of gas coal are readily obtainable. Arley gas coals would seem to range from about 6s. 9d. to 7s. 3d. per ton at the pit mouth. With regard to the proposed Conciliation Board, the opinion generally prevailing in well-informed quarters is that there is little or no probability of its being continued, unless some very considerable modification of the proposals put forward by the miners and the coalowners can be amicably agreed to. It is absolutely certain that the miners will refuse to entertain the coalowners' proposals for a 10 per cent. reduction in wages for the next twelve months; while the coalowners, on the other hand, are equally determined not to bind themselves down to a minimum wage. The general coal trade remains depressed; the position both as regards prices and demand showing no signs of any improvement. At the pit mouth, best Wigan Arley averages 9s. 6d. to 10s. per ton; Pemberton four-feet and seconds Arley, 8s. to 8s. 6d.

Northern Coal Trade.—The coal trade of this district now shows a little more activity; and there is a rather fuller amount being produced. In the gas coal trade, there is a slightly increased demand. There is considerable interest felt in the decision soon to take place as to the contracts of the largest of the local gas companies, which are invited earlier this year than usual. In the market, prices of best Durham gas coal range from 6s. 3d. to 6s. 9d. per ton f.o.b. Large quantities



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AND DOUBLE-STUDDED CAST CROWN PLATE.

A FAVOURITE PATTERN FOR HIRING-OUT BY GAS COMPANIES.

of gas coals are now being shipped abroad. The position in regard to gas coke shows no alteration this week; and the price is not affected.

Scotch Coal Trade.—The situation remains unaltered. Coalowners are anxious to do business; but among purchasers, there seems to be a belief that a reduction in wages, possibly followed by a fall in prices, may take place in England, and contracts are being entered upon charily. There is more than abundance of coal in the market; and the only variety for which there is anything like a good demand is the best quality of ell. The prices quoted remain unaltered—viz.: Main, 5s. 9d. (easy) per ton f.o.b. Glasgow; ell, 6s. 3d. to 6s. 9d.; and splint, 6s. 3d. to 6s. 6d. The shipments for the week amounted to 173,624 tons—an increase of 7868 tons upon the preceding week, and of 8900 tons on the same period last year. For the year to date, the total shipments have amounted to 3,497,320 tons—an increase upon the quantity in the corresponding period of last year of 203,934 tons.

The Recovery of Cyanides.—Messrs. W. C. Holmes and Co., of Huddersfield, who erected the whole of the machines for the extraction of cyanides at the Glasgow Gas-Works, have received a further order for plant for the works. The same firm have also lately despatched additional plant to Amsterdam, and have orders for other machines in hand; among them being a complete plant for Huddersfield, reference to which appeared in the last number of the "JOURNAL."

Stockport Gas Profits.—At the meeting of the Stockport Town Council last Wednesday, the Gas Committee reported that the profits on the past financial year amounted to £12,014. This was £4301 less than in the preceding year; and Mr. Burrows sought information as to how the falling off had arisen. The Chairman of the Gas Committee (Mr. T. Webb) explained that the price of gas had been reduced to the extent of £5294; there was a loss of £544 owing to the low price of coke, and of £490 on ammoniacal liquor; the abolition of meter-rents accounted for £484; and £355 had been paid in discounts. They had also paid more in wages and rates. On the same basis as last year, the profit would have been £19,699, or £3384 better on the year. This explanation was received with satisfaction.

Leeds Gas Workers and Pipe-Laying by Contract.—An attempt was made at last Wednesday's meeting of the Leeds City Council to rescind the resolution passed on April 6 last, approving of a proposal of the Gas Committee to have the pipe-laying work done by contract—a question which, as recently mentioned in the "JOURNAL," has been greatly agitating the minds of the workmen engaged by the Committee. The matter was brought before the Council by Mr. Connellan, who was strongly of opinion that this particular branch of the Committee's work ought to be retained in their hands. The Chairman of the Committee (Mr. Lowden) defended the resolution it was proposed to rescind, and spoke of the difficulties that had been experienced in dealing with the men—mentioning the threat to "down tools," and leave in a body last October. He pointed to the experience of Birmingham to illustrate that the work was better and more economically done by contract than by keeping it in the hands of the Corporation. Letting it by contract did not mean that there would be any lack of supervision; for the Committee would still employ a certain number of inspectors. Mr. Henry thought it was a reflection on the Gas Committee to say that they could not manage this part of its business; and he hoped the present motion would be passed. Several members joined in the discussion; but the original resolution was upheld.

The Ossett Town Council and the Gas-Works.—By eight votes to five, the Ossett Town Council have resolved to purchase the undertaking of the Gas Company for £78,840, representing twenty-four years' purchase of the maximum dividend on the authorized capital.

The Arrol-Foulis Stoking Machinery.—The Bolton Corporation have decided to adopt hydraulic stoking machinery at their Lum Street Gas-Works, and have placed an order with Sir William Arrol and Co., Limited, for complete plant, including elevators and coal breakers. The British Gaslight Company, Limited, are also about to adopt this system, and have ordered extensive plant for their Hull station.

Exhibition of Gas Appliances at Falmouth.—A most successful exhibition of gas-cooking and heating appliances manufactured by Messrs. Fletcher, Russell, and Co., has been held in the Polytechnic Institute, Falmouth. In connection therewith, a series of cookery lectures were given each afternoon and evening to large and appreciative audiences by Miss Helen Edden; and the ovation given to her at the end testified that her efforts had been greatly appreciated. Mr. J. W. Buckley, the Manager of the Falmouth Gas Company, was most assiduous in his endeavours to ensure the success of the exhibition. He had on view some gas-engines and an excellent display of incandescent gas-lights.

East Surrey Water Company.—The annual general meeting of this Company was held on Saturday, the 27th ult.—Sir F. Bramwell, Bart., in the chair. The Directors, in their report, stated that the profit on the year's working amounted to £7826. Adding the balance brought forward, £699, made a sum of £8525 available for apportionment. Out of this the Directors recommended that a dividend of 5 per cent. on the preference and ordinary shares should be declared for the year. An interim dividend, however, of 2½ per cent. on both classes of shares, disposing of £3458, having been paid in December, there remained the further 2½ per cent. to make up the full amount. This would absorb £3458, and leave a balance of £908 to be carried forward. Reference was made to the Company's Bill to sanction the acquisition of the undertaking of the Reigate Water Company, which has now passed through both Houses. The Chairman moved the adoption of the report. The Deputy-Chairman (Sir Myles Fenton, J.P.) seconded the motion; and it was carried. The dividends recommended were declared.

The Newcastle and Gateshead Water Company and the Redheugh Bridge Company.—At present Gateshead is entirely supplied with water by the Newcastle and Gateshead Water Company by means of pipes across a bridge, which is the property of the Redheugh Bridge Company. The latter body has found it necessary to apply to Parliament for power to pull down the bridge and to build a new one. Shortly, the Water Company expect to be able to have another communication with Gateshead higher up the river; but, notwithstanding, they deem it desirable that the pipes across the Redheugh Bridge should be continued, and therefore an arrangement has been made between the two Companies. The agreement provides that the Bridge Company are to rebuild the bridge, and lay across it two 24-inch steel mains, subject to the approval of the Water Company's Engineers, and to make all connections at both ends. In consideration of the Bridge Company carrying out these works, the Water Company will pay them £3500, when the works have been satisfactorily completed, and also subscribe £5000 in shares towards the cost of the bridge. The shareholders of the Water Company have approved of this arrangement.

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PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 65,095.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

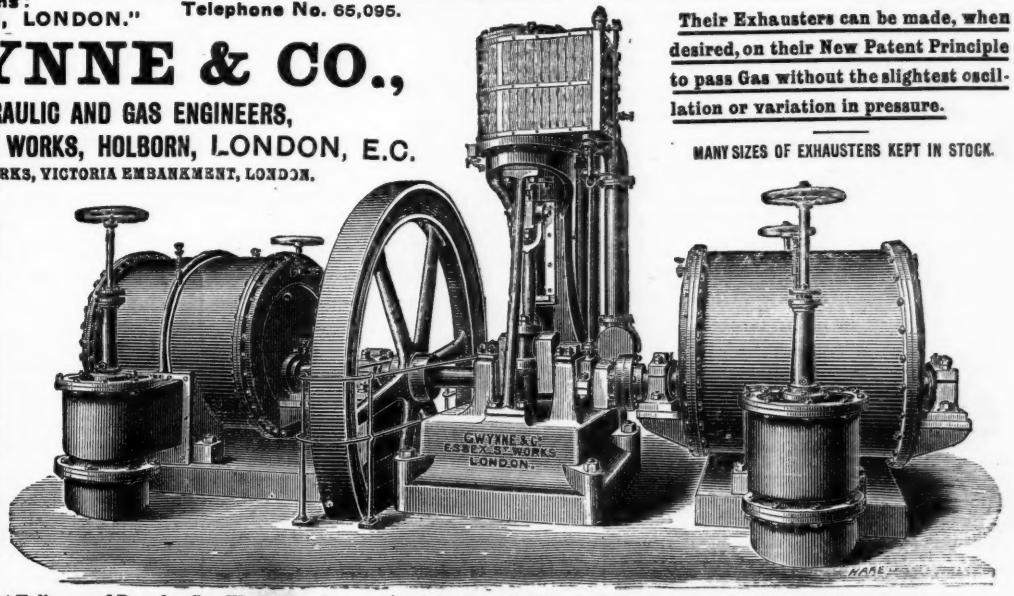
BROOKE STREET WORKS, HOLBORN, LONDON, E.C.

Late ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON.

They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, PATENT RETORT-LIDS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle to pass Gas without the slightest oscillation or variation in pressure.

MANY SIZES OF EXHAUSTERS KEPT IN STOCK.

Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.

Catalogues and Testimonials sent on application.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
JOHN WM. O'NEILL, Managing Director, Palmerston Buildings, Old Broad Street, London, E.C.

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WINKELMANN'S "VOLCANIC" CEMENT. Fire Resistance up to 4500° Fahr. In use in most Continental Gas-Works, and in more than 800 British Gas-Works.
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Correspondence invited.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

WANTED, a Situation as Gas-Fitter. Well up in all Branches of Gas Work, in and out of Works. Good References. Age 35. Married. Abstainer.
Address No. 2678, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a thoroughly practical Man, a Situation as FOREMAN of Gas-Works. Well up in Mains, Services, Meters, Stoves, and House Fittings, Index Taker, &c. First-class Testimonials.
Address No. 2677, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MANAGER of Gas-Works who, for perfectly satisfactory reasons, will be disengaged at an early date, desires appointment as MANAGER or MANAGER and SECRETARY. Ten Years' successful Working. Good Accountant. First-class References.
Further Particulars on application to No. 2679, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ADVERTISER (aged 36) seeks re-engagement as MANAGER or FOREMAN in Gas-Works. Has 21 years' experience; is a thorough practical Man, well up in detail both in Manufacture and Distribution, and fair Draughtsman. No objection to go abroad. Speaks Spanish and Portuguese. Has excellent Testimonials for past Management.
Address No. 2676, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Gentleman who has a thorough practical knowledge of the Gas Trade, including Gas-Fittings, Lamps, Chandeliers, Gas-Stoves, Tubes and Fittings, Gas-Meters, together with all accessories, who served his apprenticeship in one of the principal Gas-Works in Great Britain, and has travelled for 20 years, an appointment to REPRESENT A GOOD HOUSE in any of the above Branches. Highest References.
Address No. 2673, care of Mr. King, 11, Bolt Court FLEET STREET, E.C.

A THOROUGHLY competent Gas-Fitter wanted by a Gas Company in the South of England. A permanency to a suitable Man.
Apply, by letter, to No. 2674, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, at once, for a small Gas-Works connected with a Factory, a good second-hand GASHOLDER, 16 feet to 18 feet diameter. Quotations and Specifications for new one also invited.
Apply to the CHEDDAR VALLEY MANUFACTURING COMPANY, Cheddar, SOMERSET.

CARBONIZING Foreman Wanted for a Gas-Works in South America. Must have a thorough knowledge of the Manufacture of Gas, and must be capable of Superintending Men. Salary commencing at £20 a month, with House.
Applications, endorsed "Foreman," to be addressed to ARTHUR F. PHILLIPS, Esq., 98, PARLIAMENT STREET, S.W.

J. & J. BRADDOCK, Globe Meter Works, Oldham.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Address: "Braddock Oldham."

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JOHN NICHOLSON & SONS, Limited, Chemical Works, Leeds, specially produce this ACID from SULPHUR, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

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Telegraphic Address: "PORTER LINCOLN."

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Correspondence invited.
Telegraphic Address: "Sadler, Middlesbrough."

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Write for tabulated results.
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WANTED, a Retort Setter. Rate of pay, 9d. per hour.
Apply to the FOREMAN, Gas-Works, Bury, LANCS.

WANTED, two good Stokers. Well recommended. Shovel Work, and Engine and Exhauster. Permanent Situations. Wages, 28s. per week of Seven Shifts. Sunday Stops (without deduction of pay) when convenient.
Address J. H. SILCOX, Manager, Gas-Works, PEMBROKE DOCK.

SANDWICH GAS-WORKS.

APPOINTMENT OF WORKING FOREMAN.

THE Corporation of Sandwich invite APPLICATIONS from competent persons to carry out the duties of WORKING FOREMAN in connection with their Gas-Works, which have an annual make of about 6 Million feet.

The person appointed will be required to devote his whole time to his duties (which will include taking his turn in the Retort-House), and to enter on his work within a week from the date of appointment.

He must have a practical knowledge of the Manufacture of Gas, laying and testing Mains, laying Service-Pipes, and fixing Meters, and be competent to perform all ordinary Repairs thereto.

Salary, 30s. per week.

Applications in Candidates' own handwriting, endorsed "Gas Foreman Workman," stating Age, present and previous Occupations, and accompanied by *copies* of Testimonials (not exceeding three in number) as to Qualifications and Character, to be sent to me not later than the 16th inst.

By order,
D. BAKER,
Town Clerk.

Guildhall, Sandwich,
July 3, 1896.

GAS PURIFICATION.

OXIDE OF IRON BOG ORE.
BALE & CO.'S Oxide of uniform quality.
Sample and Price on application.
OXIDE PAINTS, OILS, SULPHURIC ACID, &c.
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FINEST Quality of Natural Bog Ore.
Particulars and price, apply to Mr. T. L. ARCHER, 20, Fennel Street, MANCHESTER.

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Prices, &c., will be forwarded on application to No. 30, ST. ANDREW SQUARE, EDINBURGH, NEWTON GRANGE, NEWBATTLE, DALKEITH, } SCOTLAND.

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INCREASE the Efficiency of your PURIFIERS by adopting CRIPPS'S PATENT BYE-PASS VALVE in the lower Tiers of Sieves. Practical Experience proves their Economy. Engineers are repeating orders after thorough trial.
References and Particulars can be obtained from the Makers—
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And J. EVERY & SON, Phœnix Iron-Works, LEWES.

BOROUGH OF SOUTHPORT.
(GAS DEPARTMENT.)

WANTED, an outside Inspector who must be well experienced in the fixing of Meters, Service-Pipes, and Fittings. Wages 35s. per week.

Applications to be in the hands of the undersigned not later than July 10 next, accompanied by three References or *Copies* of Testimonials.

JOHN BOOTH,
Engineer.

Southport, June 25, 1896.

GAS PLANT.
WANTED, good Second-Hand Gas-HOLDER, 16 feet to 18 feet diameter.
Apply, by letter, giving full Particulars, Make, and Price, to No. 2675, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE — Retort Mouthpieces, ∩ 16 in. by 14 in., ovals, 21 in. by 15 in.; 5-inch H-PIPES and DIP-PIPES; ASHPANS; also RECIPROCATING EXHAUSTER, about 8000 cubic feet per hour.
HENRY TOBEY, Gas-Works, Malton, YORKS.

HAMILTON CORPORATION GAS.

FOR SALE—Four Purifiers, 15 feet square by 4 feet deep, complete with Hydraulic Centre-Valve, 12-inch Connections and Hydraulic Lifting Apparatus; also a Round STATION METER, with 12-inch Connections, passing 23,000 cubic feet per hour.

The above are in first-class working order.

Further Particulars may be had from the undersigned.

WM. EWING,
Engineer and Manager.

Gas Office, Hamilton,
June 23, 1896.

REDHILL GAS COMPANY.

RETORT-FITTINGS FOR SALE.

THE Directors have for disposal, in consequence of pulling down the Benches, the following RETORT-FITTINGS, all of which are in excellent condition, and can be inspected any time:—

Fifty 18-inch by 15-inch ∩ Cast-Iron MOUTHPIECES, with Wrought-Iron Lids, fitted with Swing Cross-Bars and Screws.
Seventy 4-inch Cast-Iron BRIDGE-PIPES.
Seventy 4-inch Cast-Iron DIP-PIPES.
And the necessary 6-inch to 4-inch taper ASCENSION-PIPES.

Any further Particulars may be had from the undersigned.

C. READ,
Manager, &c.

GAS COAL.

THE Aldershot Gas and Water Company will, during this Month, be prepared to receive TENDERS from Firms for about 11,000 Tons of GAS COAL from Durham, Midland, and West of England Pits.

Communications may now be addressed to the HONORARY SECRETARY, Gas and Water Office, Victoria Road, ALDERSHOT.

BOROUGH OF BRIGHOUSE.

THE Gas Committee of the Brighouse Corporation are prepared to receive TENDERS for the erection of Two New PURIFIERS, COVERS, VALVES, and CONNECTIONS, complete.

Plans and Specifications may be seen, and Form of Tender obtained, on application at the Mill Lane Gas-Works, Brighouse.

Sealed tenders, endorsed on the outside "Tender for Purifiers," to be sent in on or before Friday, the 10th day of July, 1896, addressed to the Town Clerk, Public Offices, Brighouse.

The lowest or any tender not necessarily accepted.

By order,
JAMES PARKINSON,
Engineer.

Town Clerk's Office,
Public Offices, Brighouse,
June 30, 1896.

BOROUGH OF BRIGHOUSE.

THE Gas Committee of the Brighouse Corporation are prepared to receive TENDERS for providing, Fixing, and Fitting Two New Purifiers, with WOOD GRIDS.

Specification and Form of Tender can be obtained on application at the Mill Lane Gas-Works, Brighouse.

Sealed tenders, endorsed on the outside "Tender for Wood Grids," to be sent in on or before Friday, the 10th day of July, 1896, addressed to the Town Clerk, Public Offices, Brighouse.

The lowest or any tender not necessarily accepted.

By order,
JAMES PARKINSON,
Engineer.

Town Clerk's Office,
Public Offices, Brighouse,
June 30, 1896.

BOROUGH OF CHORLEY.

TO TAR DISTILLERS AND OTHERS.

THE Corporation of Chorley invite TENDERS for the purchase of the surplus TAR produced at their Gas-Works for Twelve Months from the 1st of September next, delivered in Contractor's Tanks at either of the Chorley Railway Stations.

Any further Information may be obtained on application to Mr. John M'Cubbin, Gas Manager, Chorley.

The Corporation do not bind themselves to accept any tender.

Tenders, endorsed "Tar," to be sent to me on or before Tuesday, the 21st inst.

By order,
JNO. MILLS,
Town Clerk.

Town Hall, Chorley,
July 4, 1896.

BOROUGH OF CHORLEY.

THE Corporation of Chorley invite TENDERS for the supply of GAS COAL and NUTS and LIME required at their Gas-Works during a period of Twelve Months commencing the 1st of September next.

Forms of Tender for Coal and any further Information may be obtained on application to Mr. John M'Cubbin, Gas Manager, Chorley.

Tenders, duly endorsed, to be sent to me on or before Tuesday, the 21st inst.

The Corporation do not bind themselves to accept any tender.

By order,
JNO. MILLS,
Town Clerk.

Town Hall, Chorley,
July 4, 1896.

BOROUGH OF ILKESTON.

THE Gas Committee are prepared to receive TENDERS for the supply and delivery at their Gas-Works of 5500 Tons of GAS COAL between the 1st day of September next and the 31st day of August, 1897.

Conditions and Form of Tender may be had of the Manager (Mr. F. C. Humphrys), the Gas-Works, Rutland Street, Ilkeston.

Sealed endorsed tenders must be delivered to the undersigned by Five o'clock in the afternoon of Tuesday, the 21st day of July inst.

The Committee do not bind themselves to accept the lowest or any tender; and they reserve to themselves the right to divide the quantity above named into two or more Contracts.

By order,
WRIGHT LISSETT,
Town Clerk.

Town Hall, Ilkeston,
July 2, 1896.

TENDERS FOR TAR AND LIQUOR.

THE Directors of the Slough Gas and Coke Company are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR (or either) produced at their Works, for a term of One Year ending the 30th of June, 1897.

The Slough Branch of the Grand Junction Canal is available.

The estimated quantities to be produced are: Tar, 80,000 Gallons; and Liquor, 30,000 Gallons.

The Products must be removed from the Works in Tank Carts.

Sealed tenders, stating Price for Tar per Barrel of 36 Gallons, and prices for Ammoniacal Liquor per 1000 Gallons of different strengths, at the Company's Works, and endorsed "Tender for Tar and Liquor," to be delivered on or before Tuesday, the 21st of July inst.

The Directors do not bind themselves to accept the highest or any tender.

ARTHUR THOMAS,
Secretary.

Slough, Bucks,
July 1, 1896.

SHIFNAL GASLIGHT AND COKE COMPANY.

TENDERS FOR COAL.

THE Directors of the above Company invite TENDERS for supplying 400 Tons of good GAS COAL (not Nuts or Slack).

The deliveries to be at Shifnal Station at such times and in such quantities as may be directed.

Sealed tenders to reach us on or before the 12th inst.

BENJAMIN FARMER,
EDWIN J. FARMER,
Joint Clerks to the Company.

OSWALDTWISTLE URBAN DISTRICT COUNCIL.

THE Gas Committee invite Tenders for the TAR and LIQUOR produced at their Works for One Year from the 31st day of July, 1896.

The quantity of Coal carbonized is about 3500 Tons.

Further Particulars may be obtained from the Manager, Gas-Works, Church, near Accrington.

Tenders, endorsed "Tender for Tar," to be addressed to me, and to be delivered not later than Wednesday, the 29th of July.

WM. SANDEMAN,
Clerk.

District Council Offices,
Oswaldtwistle, June 26, 1896.

NORMANTON GAS COMPANY.

TENDERS FOR TAR.

THE Directors of the above Company are prepared to receive TENDERS for the surplus TAR made at their Works during the Year ending July 31, 1897.

Quantity, about 200 Tons.

Tenders, addressed to the Chairman, to reach this Office on or before the 10th inst.

The Directors do not bind themselves to accept the highest or any tender.

EDWIN H. HUDSON,
Secretary.

Gas Office, Normanton,
July 4, 1896.

CARNARVON CORPORATION.

TENDERS FOR COAL.

THE Gas Committee of the Carnarvon Corporation invite TENDERS for the supply of GAS COAL and CANNEL. The quantity required will be about 2000 Tons of Coal and 200 Tons of Cannel, to be delivered, as required, during the Twelve Months ending the 31st of August, 1897, free in trucks on the Gas-Works Siding, Carnarvon.

Sealed tenders, endorsed "Tender for Coal," and addressed to the Chairman of the Gas Committee, Guildhall, Carnarvon, to be delivered on or before Friday, the 17th inst.

The Committee do not bind themselves to accept the lowest or any tender.

Form of Tender and any further Information may be obtained on application to the undersigned.

HARRY D. DUESBURY,
Manager.

Gas Office, Carnarvon,
July 1, 1896.

TENDERS FOR TAR.

THE Gas Committee of the Carnarvon Corporation invite TENDERS for the purchase of the surplus TAR made at their Works during the Twelve Months ending the 31st of August, 1897.

The Tar will be loaded free into Contractors' Tank-Trucks on Rail at the Gas-Works Siding, Carnarvon.

Payments: Net Cash Monthly.

Sealed tenders, endorsed "Tender for Tar," and addressed to the Chairman of the Gas Committee, Guildhall, Carnarvon, to be delivered on or before Friday, the 17th inst.

The Committee do not bind themselves to accept the lowest or any tender.

Any further Information may be had from the undersigned.

HARRY D. DUESBURY,
Manager.

Gas Office, Carnarvon,
July 1, 1896.

THE Gas Committee of the Aberavon Corporation are prepared to receive TENDERS for the construction of a STEEL TANK and GAS-HOLDER. Dimensions as follows: Tank, 84 feet diameter by 27 feet deep; Gasholder, 80 feet diameter by 26 ft. 3 in. deep at the sides, with Cup prepared for Telescoping.

Each party tendering to furnish his own Designs and Specifications, and to take all responsibility of the Excavation, Concrete Foundation, and (if necessary) Piling.

Each tender to state total weight of Gasholder and Tank separately, which will be checked by the Corporation or other Weighing-Machine.

Site can be seen and further Particulars obtained by applying to Mr. G. W. Harrison, Gas Manager.

The whole work to be done to the satisfaction of the Gas Committee or whom they may appoint.

Sealed tenders, endorsed "Gasholder," addressed to the Chairman of the Gas Committee, to be sent to me not later than the 27th inst.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
M. TENNANT,
Town Clerk.

Aberavon, Port Talbot,
July 1, 1896.

Fcap. 4to, Cloth, price 7s. 6d., post free.

Practical Photometry.

By William Joseph Dibdin, F.I.C., F.C.S.

LONDON: Walter King, 11, Bolt Court, Fleet St., E.C.

ISSUE OF STOCKS AND SHARES BY AUCTION UNDER PARLIAMENTARY POWERS.

MR. ALFRED RICHARDS undertakes the issuing by Auction of GAS AND WATER SHARES under Parliamentary Powers.

He also holds MONTHLY SALES of GAS AND WATER SHARES at the Auction Mart, Tokenhouse Yard, E.C.

Terms for the issuing of Capital, and also for offering to auction Gas and Water Shares, and all Particulars relating thereto, may be had of Mr. Alfred Richards.

Offices: 18, FINSBURY CIRCUS, E.C.

SALE ON MONDAY, JULY 27, 1896.

STOCKS AND SHARES IN GAS AND WATER COMPANIES AS FOLLOWS:—

Portsea Island Gaslight Company.
Barnet District Gas and Water Company.
Croydon Commercial Gas and Coke Company.
Romford Gas and Coke Company, Limited.
Goring and Streatley District Gas and Water Company.
Walton-on-Thames and Weybridge Gas Company.
Grays Gas Company.

To be SOLD by AUCTION, by

MR. ALFRED RICHARDS, at the Mart, London, E.C., on Monday, July 27, at Two for 2.15 o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors.

TO TRUSTEES AND INVESTORS.

NOTICE OF SALE BY AUCTION BY

MESSRS. CRAWTER, at the Falcon Hotel, Waltham Cross, on Thursday, July 23 1896, at Six for Seven o'clock precisely, of £3150 PERPETUAL 4 per cent. DEBENTURE STOCK of the Waltham Abbey and Cheshunt Gas and Coke Company.

The last Half-Yearly Dividends have been at the rate of 7 per cent. per annum on the Original Share Capital of the Company. The increase in the Consumption of Gas during the last Four Years amounts to 10 million cubic feet; and, as the neighbourhood is rapidly developing, a further increase of Consumption may confidently be anticipated.

Particulars may be obtained of the SECRETARY of the Company, Waltham Abbey, ESSEX; at the place of Sale; and of Messrs. CRAWTER, Land Agents and Auctioneers, Cheshunt, HERTS.

Price 6s., Cloth Bound,

THE CHEMISTRY OF ILLUMINATING GAS.

By N. H. HUMPHRYS, Assoc. M.Inst.C.E., F.C.S.

This work contains chapters on: The Relative Cost of Light from Gas, Oil, and Candles; Products of Combustion; The Sulphur Question; The Composition of Illuminating Gas; Water Gas; Various Gas-Making Processes; Oil Gas; Properties of Fluid Hydrocarbons; Tar for Gas-Making; Destructive Distillation Condensation; and Purification.

WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

NOTICE.

The attention of the METEOR INCANDESCENT LIGHTING COMPANY, LIMITED, having been again called to the Advertisements inserted in various papers by the Incandescent Gas-Light Company, Limited, of Palmer Street, Westminster, to the effect that the "Meteor" Incandescent Gas-Lights are an Infringement of their Patents, and that they will bring Actions for Infringement against all persons found dealing in any manner with such Lights, the METEOR INCANDESCENT LIGHTING COMPANY, LIMITED, HEREBY GIVE NOTICE that they are advised that the "Meteor" Incandescent Lights in no way infringe any of the Patents of the Incandescent Gas-Light Company, Limited, that an action has been commenced to restrain such threats, and that they are PREPARED TO FULLY INDEMNIFY ALL PURCHASERS, DEALERS, AGENTS, and USERS of their Lights against any Legal Proceedings on the part of the Incandescent Gas-Light Company, Limited.

WILSON, BRISTOWS, & CARPMAEL

1, Copthall Buildings, London, E.C.,

Solicitors to the Meteor Incandescent Lighting Company, Limited, of 35, New Broad Street, London, E.C.

Nov. 30, 1895.

THE LIGHTING CORPORATION, LIMITED.

Important Installation of Improved Ventilating Wenham Lamps at the Woolpack Restaurant, Gracechurch Street, E.C., And Improved Wenham Street Lamps in Piccadilly.

The LANCET says:—

IMPROVEMENTS IN LIGHTING.—The question of lighting, both in our streets and for ordinary domestic purposes, is one of such importance from the hygienic point of view that the formation of an influential body to develop and "engineer" any new system which gives promise of advance should be welcomed. Such would appear to be the aim of the Lighting Corporation, Limited, the installation of which was signalized by a banquet given on the 2nd inst. We understand that this Corporation has been formed with the view of acquiring any system of lighting which gives evidence of improvement upon existing systems in regard to lighting efficiency, economy, and its hygienic aspect. At present, however, their operations are confined to the development and improvement of the well-known Wenham regenerative burner. The principle of this burner consists in heating the gas before it is burnt, so that the gas is made more luminous by the so-called regenerative process. However that may be, the burner is so constructed as to effect a powerful ventilating action upon the air of the room, while at the same time the products of combustion are carried away. Experimental evidence of this ventilating action was shown on the occasion of the banquet referred to, when the underground room in which the banquet was held was illuminated by means of Wenham burners. In spite of the oppressive heat of the weather at the time the room was comparatively fresh and cool, and when smoking was commenced by some 200 persons present the air remained practically unclouded. Moreover, the products of combustion being carried away very little heating effect upon the air of the room takes place, while the deteriorating effects of the products of the combustion of coal gas are entirely avoided. The light serves well for street-lighting purposes since its strong sunlight colour is highly penetrative. In this way the Wenham burner plays an important part as a lighting appliance possessing hygienic advantages. The Lighting Corporation have established offices at 4, Bloomsbury Street, W.C., where an excellent installation of the Wenham system may be viewed.

The JOURNAL OF GAS LIGHTING says:—

REVIVAL OF REGENERATIVE GAS LIGHTING IN LONDON.—Those of our readers who followed the fortunes of the Wenham Company will remember that about this time last year that undertaking was in a moribund condition. It had had an interesting—not to say remarkable—career. The Company started in Rathbone Place with a small capital in 1884; but so successful were their operations that much more extensive premises in Upper Ogle Street, Fitzroy Square, were taken, and the concern was reconstituted with £250,000 capital to keep it going. Business flourished, and for a time good dividends were paid. Then troubles arose, and the Company declined. On the 18th of July, 1895, the premises were put up to auction without securing a bid; and on the following Monday, the goodwill of the business and the patent rights were disposed of for £200. Thus in the space of about a dozen years was witnessed the introduction, development, and decline of a system of lighting which offered many advantages to gas consumers. The Company passed out of existence; but almost simultaneously there arose a new one to carry on the work—for the system remained, and there were many who thoroughly believed in it. Under the title of the Lighting Corporation, Limited, a company was formed, not only to exploit the Wenham lamp, but to do a great deal more. Their object, as set forth in their registration notice, was to "maintain and uphold any appliances, apparatus, or plant, requisite for gas, electric, oil, or any other methods of lighting now in vogue, and to carry on the businesses of manufacturers of, and dealers in, incandescent lights, and other apparatus for increasing the illuminating power of gas, spirits, oil, or other heat-producing agents, and suppliers of light, heat, electricity, and motive power." It was further specified that the Corporation would "undertake work as electricians, gas engineers, gas workers and fitters, manufacturing, analytical, and general chemists, chemical manufacturers, mechanical engineers, and ironmongers." Though the company have not made a very great noise in the short time which has elapsed since their incorporation, they are able to show a good record of work. They took the premises No. 4, Bloomsbury Street (a house which we believe was once occupied by Sir James Thornhill, the historical painter), and fitted up the rooms in such a way as to exhibit all the advantages possessed by the system of lighting with which they are mainly concerned—not, it should be stated, the old system, but a greatly improved one. Further, they made provision for carrying on an extensive business by securing an excellent site for new premises on the spot where for many years stood Bedford Chapel, at the corner of Oxford Street and what is now Shaftesbury Avenue—the chapel to which for some years the late Rev. J. C. M. Bellew attracted such large congregations of enthusiastic admirers, and wherein, till health failed, the Rev. Stopford A. Brooke carried on his ministry. On this site, which is within a few yards of the present premises, is to be erected a building of very effective exterior, and replete within with every convenience. Pending the completion of this establishment, however, the Directors have been utilizing the plant of the old Company, and taking steps to bring about an extended adoption of their system. Turning their attention to public lighting, for which they believed it to be well adapted, they fitted up three lamps in St. George's, Hanover Square—one at the top of St. James's Street, another in the middle of Piccadilly, and the third opposite the Junior Athenæum Club. These have proved so successful, that permission has been given by the Vestry for the erection of sixteen more lamps in Piccadilly. Coming to interior lighting, an important installation of the system has been provided on the premises of Messrs. Jones and Higgins, of Peckham; while another may be seen at the Blue Posts, in Tottenham Court Road. At the first-named establishment, the light is found to be admirably suited for the selection and matching of coloured articles; while at the latter the proprietor has adopted it in place of electric lighting. He had the latter illuminant laid on at an annual cost of about £400; but he became dissatisfied with it on the two very important grounds of inadequate lighting and defective ventilation. Seven Wenham lamps were fitted up by the Corporation, at a cost of £150; and he has now something like five times the amount of light, and moreover his house is properly ventilated, at an annual cost for gas and maintenance of less than half the amount he previously paid. The system is also in use at the Cavour Restaurant in Leicester Square, and at the Woolpack Restaurant in Gracechurch Street—eight large ventilating lamps having been put in at the latter establishment. An example of what the Corporation can do in the way of church lighting may be seen at St. Patrick's, Soho Square, where twelve lamps have been provided; and the suitability of the Wenham system for the illumination of a large printing establishment has been demonstrated at the new works of Messrs. Eden Fisher and Co., in Fenchurch Street, where 24 lamps have been fixed. The system has also been adopted in several other establishments; and business has likewise been done by the Corporation in other departments than that of lighting. In the supervision of all this work, in addition to which the whole of the plant and machinery had to be removed from the old factory to the new works and warehouse in Dyott Street and Charlotte Mews, W.C., the Chairman of the Corporation (Mr. S. H. Robinson), the General Manager (Mr. Charles Pond), and the Secretary (Mr. W. A. Gifford-Allen) have been unceasing in their efforts to start the new undertaking on a thoroughly satisfactory foundation.

Having, as the outcome of their past ten months' labours, some definite results to put before the public, the Directors last Tuesday invited a number of gentlemen interested financially or professionally in questions of lighting and ventilation, as well as representatives of the Press, to see for themselves what had been accomplished at the Woolpack Restaurant. A spacious room in the basement, which had only that morning passed out of the hands of the Corporation's workmen, was the one specially selected for inspection; and here nearly two hundred guests sat down to a banquet presided over by Mr. G. F. L. Foulger, the Chief Distributing Engineer of The Gaslight and Coke Company. On descending out of the bright sunshine of a June evening, the appearance presented by the room was gloomy enough; and the atmosphere was not particularly fresh. But when the gas was turned on, the whole of the place was bathed in a well-diffused light, which revealed to the assembled company the beautiful floral decorations which had been specially provided for the occasion by Mr. Welbore S. Ellis.

Continued on next page.

THE LIGHTING CORPORATION—*Continued.*

As the banquet proceeded, the temperature of the room appreciably improved. In the course of his remarks in proposing the toast of the evening—"The Lighting Corporation"—the Chairman alluded specially to this fact, and pointed out that the improvement had taken place notwithstanding that most of the guests were smoking. This result was attributable to the system of lighting and ventilation adopted. He went on to say that gas companies are really not so black as they are painted; and that, if consumers would trust them, they would be only too anxious to recommend the best methods of lighting—in fact, it was to their interest to do so. With regard to the Company with which he had the honour to be connected, he could say unhesitatingly that they were always prepared to do this. He explained that he was not there as one interested in the Lighting Corporation to the extent of a penny piece, but simply as one who was concerned with giving the public the greatest value for its money; and he expressed the hope that his presence might not be misunderstood. He coupled with the toast the name of the General Manager. Mr. Pond, who was very cordially received, in responding, stated briefly the main objects and the policy of the Corporation. He said they were not bound to any particular system of lighting, and were only interested in the Wenham lamp to this extent—that, as they were advised, it was the most economical method of lighting, and that by it the best utilization of gas was obtained. If a better system were introduced to-morrow, the Corporation would be the first to adopt it. He then gave particulars of the various installations of the system which the Corporation have carried out, to which reference has been made above. The Hon. Howard Spensley proposed "The Press," which was responded to (among others) by Mr. F. Carruthers Gould, the eminent caricaturist, who stated that for 27 years he had never had gas in his house, because it vitiated the atmosphere; but from what he had seen of the Wenham light—especially its behaviour under the very severe test to which it had been put in that room—it seemed to approach the highest ideal of what a gas light should be. Mr. Pond proposed "The Chairman." He remarked that gas companies were most eager to assist anything which tended towards better lighting; and the presence of the Chief Distributing Engineer of The Gaslight and Coke Company was, he thought, sufficient testimony that the Company were endeavouring to support approved new methods of illumination. Mr. Foulger having briefly acknowledged the compliment, the entire company were conveyed in private omnibuses to the Duke of York's Theatre (which has been ventilated by the Corporation), the dress circle and stalls of which had been reserved for the occasion. On leaving the theatre, the guests were conveyed in cabs to the offices in Bloomsbury Street, where supper was served, and an opportunity was afforded of inspecting the magnificent suite of rooms in that historic house. One of these was without either window or fireplace; and yet, notwithstanding the smoking going on, the air was cool. It only remains to say that the hospitality of the Directors was fully appreciated by those who had had the privilege to partake of it; and it was acknowledged in suitable terms before the company separated.

The PALL MALL GAZETTE says:—

Improvements in Gas Lighting.—The steady advance in the application of electricity to illuminating purposes has not only brought its direct advantages to the public, but by putting the gas interest upon its mettle it has indirectly done great service in improving the ordinary form of lighting. Never before have so many valuable and ingenious systems for using gas to the best advantage been brought forward. The old Wenham regenerative burners, the patents for which have passed into the hands of the Lighting Corporation (Limited), have been further improved so that at the Corporation's offices at 4, Bloomsbury Street, W.C., the Duke of Coburg was, the other day, enabled to see in operation a gas-lighting installation which in many respects is perfect. One advantage which gas has over electricity is that if properly used it serves the purposes of ventilation as well as of illumination, and at the Corporation's show-rooms there may be seen apartments brilliantly lit by sun-burners, which induce so constant and steady a supply of air that the rooms, although they are small, and the windows and fireplaces are closed up, keep always fresh and cool. The Duke, who has had trial of one of these lights at Clarence House, spent some time in the show-rooms, and was greatly interested. The establishment is of itself well worth visiting, for it was in this old Bloomsbury house, of which every room shows in carving and decoration the hand of the brothers Adam, that Sir James Thornhill lived and worked. Beautiful as the cornices and ceilings and carved marble fireplaces are, they are not more charming than the contents of the rooms, which, in order that the light may be properly tested, have been filled by the Corporation with fine pictures and delightful objects of art of all kinds. Even delicate water-colours are exhibited in the pure white light of the improved Wenham burners to excellent advantage.

The GAS WORLD says:—

The regenerative system of gas lighting has been somewhat neglected of late, but the Lighting Corporation, Limited, of 4, Bloomsbury Street, W.C., is endeavouring to give it a new lease of life. When the ill-fated Wenham Company's career ended, the Lighting Corporation bought the patents and goodwill, as well as the stock of Wenham regenerative lamps, and immediately proceeded to try what could be done in the way of simplifying and improving the system. The labour and capital thus bestowed has not, we think, been without reward; for the Lighting Corporation is now making a lamp which is a decided improvement upon the old Wenham. The construction of the lamp has been simplified and perfected. Where formerly there were many parts requiring fitting and joining, there are now only two; and the manufacture of the burner nipple and of the reflector has been reduced to the regions of exact science. Further, a simple addition to the regenerator, in the shape of a coil upon the gas-supply pipe just before it arrives at the burner nipple, increases the regenerative effect, and results in a great improvement in the appearance of the flame; the flame given by the new lamp is whiter, more transparent, and more powerful than the Wenham flame of old. Indeed, it will compare favourably, in those respects, with flames of even greater brilliance than those associated with the old Wenham. We have not seen any photometric tests of the new lamp, but a personal inspection of it leads us to believe that a considerable gain in light efficiency has been secured, and that the combustion is perfect. One would have thought that the coil upon the gas-supply pipe, situated, as it is, near the centre of heat, would result in carbon deposits, and consequent blocking of the gas supply, but we are assured that tests, extending over weeks, have given no indication of that. If this claim of freedom from deposit in the coil can be substantiated by a prolonged experiment, there can be no doubt that a distinct advance has been made in the regenerative system of lighting.

The WESTMINSTER GAZETTE says:—

Light, More Light!—"Light, more light!" is an old cry of many modern applications. The ordinary householder is puzzled to know why he cannot get enough light in his rooms to show off his treasures of art, and he dislikes too many burners—too much gas damages his pictures and rots his books. But all things come to those who wait, and great results have been achieved by the Lighting Corporation, of Bloomsbury Street, Oxford Street, W.C. The house occupied by the Company has an interest of its own. It was Sir James Thornhill's residence, and a beautiful old London house of the Adam time it is. By way of experiment, the Corporation has lighted each room on a model principle; the system is to flood the room with a pure clear light, and at the same time to provide thorough ventilation. Hence you get your light without the discomfort of heat, and, above all, without poisoning the atmosphere of the room. In a couple of instances the test is a severe one. The rooms are without windows, and yet the air is perfectly cool. The lamp is fitted in the centre of the ceiling, a Wenham lamp being used. But the Wenham of to-day is not to be looked upon as a twin brother of the old lamp. The light has been vastly improved. In the house there is a specimen billiard room, and here the evenness of the light is apparent, and although the ceiling is low the air is cool. A big crowd enjoyed their Havanas in all the rooms, and yet "the cloud" had as little effect on the air of the place as it would on the atmosphere if the patrons of the weed had been partaking of their puff in the public highway. Certainly it seems as if the Wenham light has a new future before it. Already it is in use in many public places, such as the Cavour and Woolpack Restaurants, St. Patrick's Church, Soho Square, and we understand that a trial of the light is being made in the streets in a prominent portion of the St. George's (Hanover Square) district.

TRUTH says:—

The shares in the Lighting Corporation, Limited, have advanced 3⅛. This Company is apparently very successful with the improved Wenham Lamp, which is the nearest approach to sunlight as yet achieved, and has great ventilating properties, which secure quite a clear atmosphere even in rooms where there is a great deal of tobacco smoke.—Your affectionate uncle.

The REFEREE says:—

The Lighting Corporation, Limited, having installed their New Light (adapted by them from their recently-acquired Wenham Patent) at that ancient hostelry the Woolpack, invited thereto, on Tuesday evening, some 200 folk to see how they could eat by it. The Light proved so brilliant that the 200 managed to eat (and eke to drink) in perfect comfort. Moreover, thanks to the ventilating process associated with the New Light, the room was wonderfully cool, considering the clouds of smoke—and oratory—that anon prevailed. Indeed, the said Light will doubtless be demanded by many a catering Goethe, especially at such subterranean banquet-hall as that whereinto we were woolpacked on Tuesday. There were sundry toasts, embodying

Continued on next page.

THE LIGHTING CORPORATION—*Continued.*

technical and elaborate expositions of this illuminating patent, from the chairman, Mr. G. F. L. Foulger, and the vice-chairman, Mr. C. Pond, who in his leisure acts Shakespeare, and acts him very well. During these Ciceronian proceedings Mr. Pond told us that the Lighting Corporation had taken for its headquarters the chapel so long occupied and adorned by the Rev. Stopford Brooke. After the banquet was over the two hundred diners, including several leading divines—and one eminent caricaturist—were packed into chariots and borne off to the Duke of York's. Some good easy folk thought this was arranged in order to help us to laugh our dinner down over "The Gay Parisienne." But, of course, it was really that we might see how this Corporation of light and leading had illuminated that theatre.

The CITIZEN says:—

A banquet at the Woolpack, an inspection of the installation at the Duke of York's Theatre, and subsequently at the rooms of the Lighting Corporation, Limited, served to place before the public the great stride which has been made by an improvement of the Wenham gas light. The light, as shown on these various occasions, is as near an approach to sunlight as can be imagined, and shows up pictures, carpets, and wall decorations excellently, and with the greatest possible precision. It has also the advantage of inducing ventilation to a remarkable extent, so much so that at the Woolpack banquet the smoke from hundreds of cigars and cigarettes, which were lighted after dinner, disappeared as if by magic. The banquet was presided over by the Chief Distributing Engineer of The Gaslight and Coke Company, who spoke most eloquently in favour of the light, and the gas companies generally are apparently doing their best to support its introduction. That they should do so, notwithstanding the great economy which is effected by it, reflects credit upon them, but this is a progressive policy which the chief gas companies have for some time followed, and there is little doubt that the large business already done by the Lighting Corporation will further increase. It may be mentioned that large dealings have taken place in the shares, which are quoted at from 3⅜ to 3⅞.

The WESTMINSTER BUDGET says:—

Concerning Hearth and Home.—Gas *v.* Electricity.—But to-day I give you a kernel. It is in regard to lighting your house artificially. Naturally there is more than one way of doing this, but the best way is always the wisest. Now, the course that at this moment appears to me worthy of consideration is that you should look in at the Lighting Corporation, 4, Bloomsbury Street, Oxford Street, W.C., and see how they suggest to give you light and pure air in your rooms or on your stairways at one and the same time. Your dining-room ought always to be kept ventilated, and it is so here, and although it has in this case purposely no windows, the room is as sweet-smelling as a violet, and comparatively as fresh as a Highland grouse drive, and just because the Lighting Corporation knows its business. You and your friends may blow a hundred-and-one clouds, and yet the smoke does not lay hold of the room. To put the light and air arrangements to the severest test, neither of these three just-named rooms have windows. The light in these rooms as well as the drawing-room comes from a Wenham lamp fixed in the centre of the ceiling. A moment, though. Don't think it is the old Wenham—that is not so. The old lamp has passed through a renaissance. The principle is the same, but the improvements in it really constitute it a new light. Besides the rooms I have mentioned, there is a billiard-room to look into, and here the light is just what you want if you would play—perfectly even and perfectly diffused. And the air of the room, though the ceiling is a little low, is fresh. And what is good for the house is equally useful for public places. I understand that the Lighting Corporation has recently fitted up several big dining restaurants with its light, one quite underground, and the effect in each instance is the reverse of stuffy. The light has also been applied to sacred buildings. A notable example of what can be done in the way of lighting and effect can be seen in St. Patrick's Church, Soho Square, W. A trial is also being made in the streets with the light, and all the refuges along Piccadilly, right from St. James's Street to Hyde Park Corner, are now brilliantly illuminated by the Lighting Corporation, which appears to be giving great satisfaction, police, 'bus drivers, cabmen, and others speaking much in favour of the new system. The other day the Duke of Saxe-Coburg and Gotha visited the show-rooms in Bloomsbury, and stayed an hour and a half inspecting the different departments. His Royal Highness expressed his high appreciation of the Corporation's system of lighting and ventilation, which has been already partially installed at Clarence House.

No. 4, BLOOMSBURY STREET, W.C.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED,
— *v* —
"DE MARE" COMPANY.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED.
— *v.* —
"SUNLIGHT" COMPANY.

THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED, HEREBY GIVE NOTICE, as follows:—

VALIDITY. The Company's Patent has been declared VALID ON ALL POINTS after a Fifteen-Day Trial.

NATURE OF INVENTION. The Invention was described by Mr. Justice Wills as a "PIONEER INVENTION."

SCOPE OF PATENT. The Patent HAS BEEN GIVEN A WIDE CONSTRUCTION; and it was held that the protection given by it was not confined to Mantles manufactured according to the particular prescriptions set out in the Specification.

SHAPE OF MANTLE. The Judge held that a Mantle, even if made in a different form or shape (such as the "De Mare" Fringe or Plume), IS STILL AN INFRINGEMENT of the "Welsbach" Patent.

"DE MARE" JUDGMENT. Judgment for an INJUNCTION, WITH FULL COSTS, has been given against the "De Mare" Incandescent Gas-Light System.

"SUNLIGHT" JUDGMENT. Judgment was given AGAINST the "Sunlight" Incandescent Gas-Lamp Company, Limited, on the question of the VALIDITY OF THE PLAINTIFFS' PATENT.

"SUNLIGHT" MANTLES. Last about 100 hours.

"WELSBACH" MANTLES. Last about 1000 hours.

"Sunlight" Mantles BURN DOUBLE THE GAS to produce the same candle power as the Incandescent Gas-Light Company's Mantles.

Users of "Sunlight" Mantles are applying to the Incandescent Gas-Light Company to REPLACE THEM BY THEIR OWN MANTLES.

WARNING. Users of the Incandescent Gas-Light Company's Mantles upon "Sunlight" Burners ARE INFRINGERS OF THE COMPANY'S PATENT, AND WILL BE AT ONCE PROCEEDED AGAINST.

COSTS. Certificates of the Validity of the Company's Patent have been granted both by Mr. Justice Romer and Mr. Justice Wills entitling the Company to Solicitor and Client Costs, which will, IN ALL CASES, BE RIGOROUSLY ENFORCED.

INFRINGERS. The Incandescent Gas-Light Company WILL TAKE PROCEEDINGS AGAINST ALL PERSONS INFRINGING THEIR PATENT, WHETHER
MAKERS,
WHOLESALE DEALERS,
RETAILERS,
or
USERS.

Users of the Company's Mantles upon Burners not sold by the Company ARE INFRINGERS.

"LIMITED LICENSE" WARNING. Judgments have already been obtained against such users from Mr. Justice Chitty, Mr. Justice Stirling, Mr. Justice Kekewich, and Mr. Justice North.

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11, Victoria Street,
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April, 1896.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

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8 Lombard Street,
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W. RICHARDSON, Fitter.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

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NEWBATTLE COLLIERIES,
DALKEITH, N.B.

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FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,
COUNTY OF DURHAM.

Available output up to 5000 tons per day.
Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,
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HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation.

Yield of Gas Per Ton . . 11,205 Cubic Feet.
Illuminating Power, 16 1/10 Stand. Sperm. Candl.
Coke (of good & pure quality) 13¾ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton . . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . 13½ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar. . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 94½ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COAL-FIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

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SPECIALISTS

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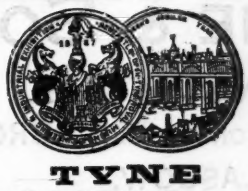

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BOGHEAD
CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 17·8 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

For Prices and complete Analysis, apply to

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COAL OWNERS, NEWCASTLE-ON-TYNE;
OR
E. FOSTER & CO.,
12, JOHN STREET, ADELPHI, LONDON, W.C.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD
BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

LOW MOOR BLACK BED
GAS COAL.

YIELD OF GAS PER TON - 10,375 CUBIC FEET.
ILLUMINATING POWER - 17·50 SPERM CANDLES.
COKE - - - - - - - - 75 PER CENT.

Prices, f.o.r. or f.o.b., on application to

GEORGE & JOHN HAIGH,
RAVENS LODGE AND CONYERS' COLLIERIES,
DEWSBURY.

A TRIAL IS RESPECTFULLY SOLICITED.

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WORKED BY THE

WEARDALE IRON & COAL CO., LD.

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by

Messrs. J. & H. S. PATTINSON, *May 28, 1895,*

Yield of Gas per Ton . . 10,500 Cub. Ft.
Illuminating Power . . 16·9 Candles.
Coke (of good quality) . . 67·5 per Cent.
Sulphur . . . . . 0·58 „
Ash . . . . . 2·73 „

For Price, &c., apply to the

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QUAYSIDE, NEWCASTLE-ON-TYNE.

BOLDON GAS COALS.

Worked by THE HARTON COAL CO., LTD.

Output about 3000 tons per day.

ANALYSIS—

Yield of Gas per ton .	10,500	Cubic Feet.
Illuminating Power . .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

Boldon Gas Coals are supplied under contract to

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Danish Gas Company, Bombay Gas Company, San Paulo Gas Company, Alliance and Dublin Consumers' Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

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Prices are Reduced.

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Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

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James Hunter, Miner, and Shipper of NATURAL IRISH BOG ORE.

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Samples and Prices on application.

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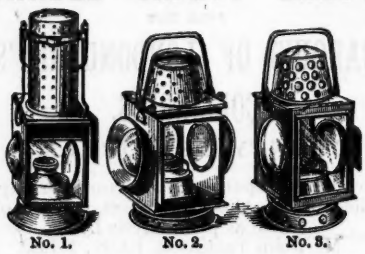

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HUTCHINSON BROTHERS,

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Wood and Wrought-Iron Purifier-Grids. Scrubber Boards.

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Have constructed their EUROPEAN type of

CARBURETTED WATER-GAS PLANT

At the following Gas-Works:—

Copenhagen	700,000 Cub. Ft.	Liverpool	2,500,000 Cub. Ft.
Belfast	1,700,000 ,,	Brighton	1,250,000 ,,
Glasgow	300,000 ,,	Bath	1,000,000 ,,
Brussels	700,000 ,,	Preston	1,500,000 ,,
Santiago	400,000 ,,	Southport	750,000 ,,
Swansea	700,000 ,,	New York	1,000,000 ,,
Tottenham	600,000 ,,	Newburgh, N.Y.	350,000 ,,

And have now under Contract:—

Belfast (Second Contract)	3,500,000 Cub. Ft.	St. Joseph, Mo.	750,000 Cub. Ft.
Edinburgh	2,000,000 ,,	Holyoke, Mass.	500,000 ,,
Tottenham (Second Contract)	750,000 ,,	Shanghai	225,000 ,,
Winchester	200,000 ,,	Stockton-on-Tees	600,000 ,,
Hoylake	125,000 ,,	Stockport	600,000 ,,
Manchester	3,000,000 ,,	Norwich	1,250,000 ,,
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Analysis: 12,600 Feet of 19-Candle Gas per Ton.

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Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

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Gas-Bags for Mains. High Water-Boots. Woollen Miners' Jackets.

Delivery and Suction Hose, Gutta-Percha Acid Bottles, Leather Driving Bands, Woven Canvas Hose for Fire-Engines, Wedge and Square Gas-Bags, Air and Water Beds for Invalids, Oil Tarpauling Coats, Trousers, Hats, &c., Squeegees for cleansing Pavements, &c., Billiard and Bagatelle Cush, Tricycle Tyres, Leather Hose, Cotton Waste, Engine Cloths, Oils, &c., India-rubber Waterproof Garments for Walking, Driving, or Sporting Wear, Diving and Wading Dresses, Printers' Blankets, Iron Wheels and Rollers covered with India-rubber. Stokers' Gloves, 14s. 6d. per dozen.

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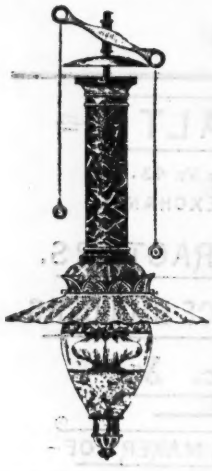

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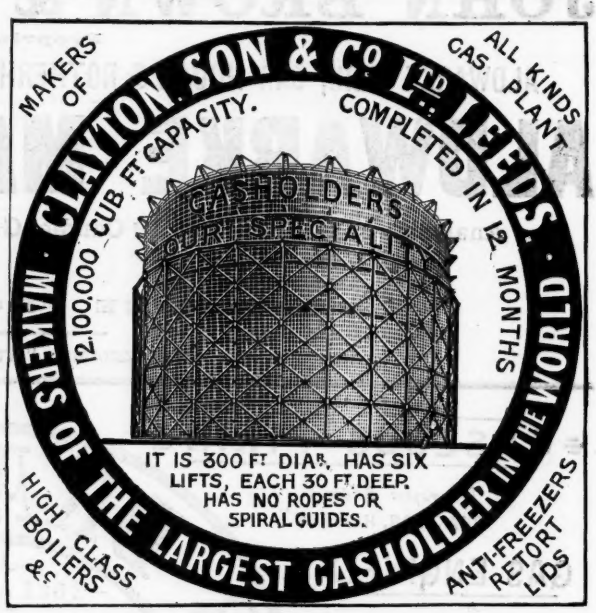
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12,100,000 CUB FT CAPACITY.
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IT IS 300 FT DIAM. HAS SIX LIFTS, EACH 30 FT DEEP. HAS NO ROPES OR SPIRAL GUIDES.
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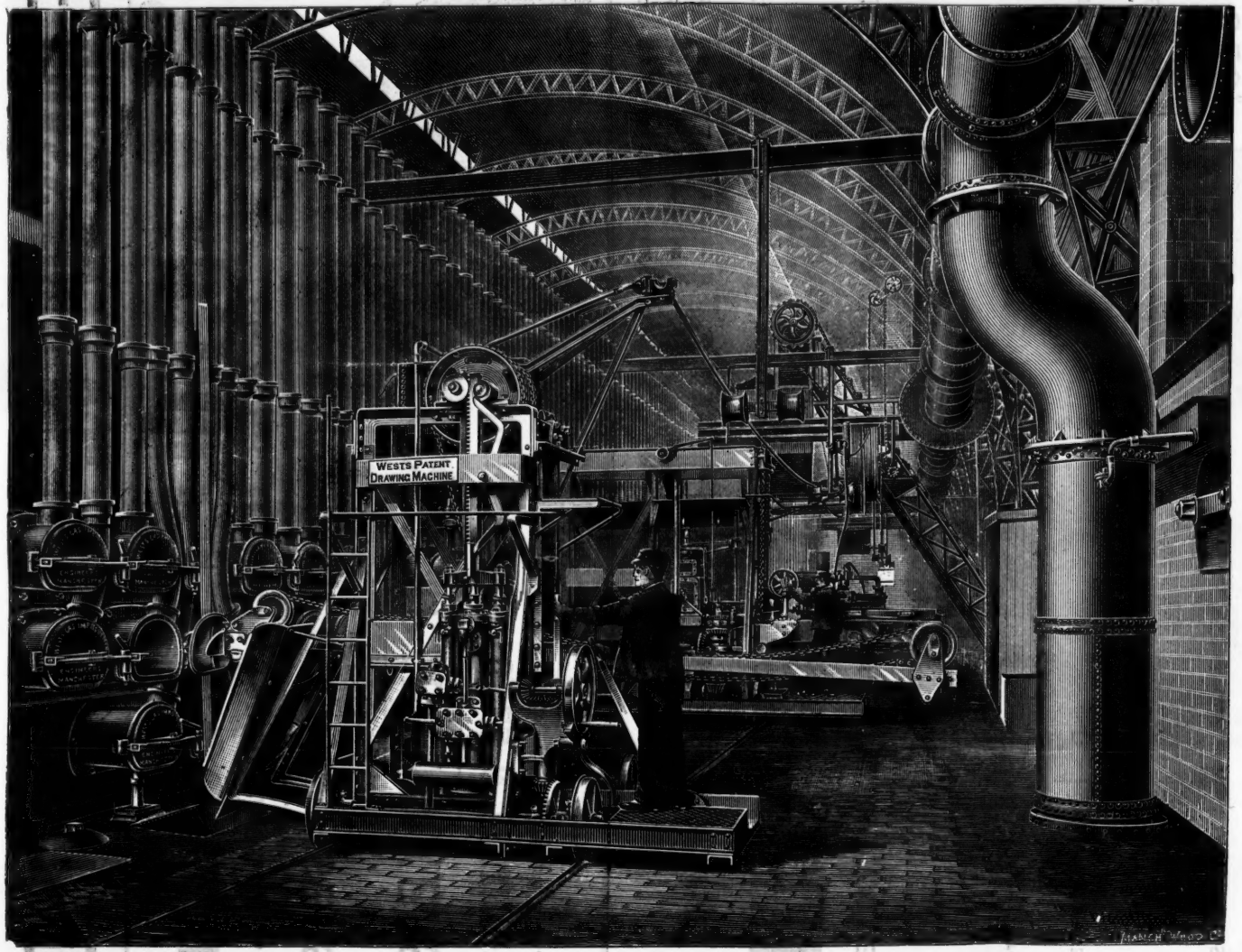

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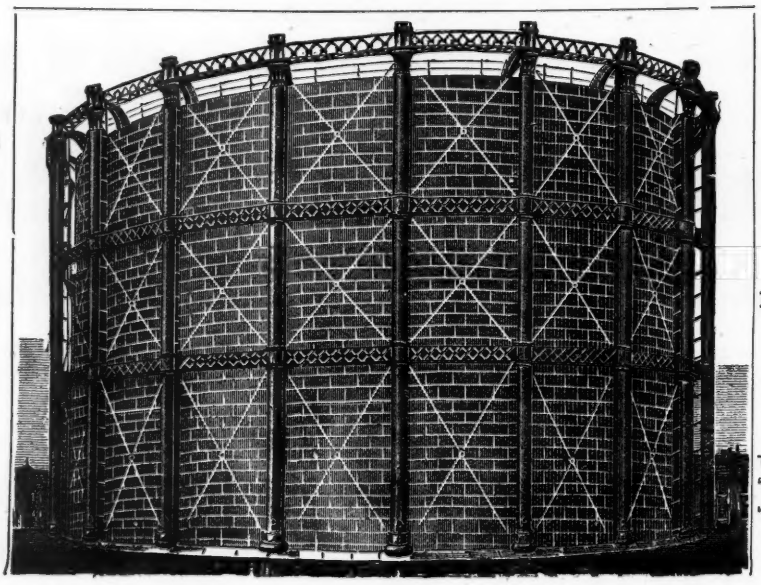

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This Process for Enriching Coal Gas has now been adopted by nearly **50** Gas-Works at Home and Abroad, and continues to give complete satisfaction.

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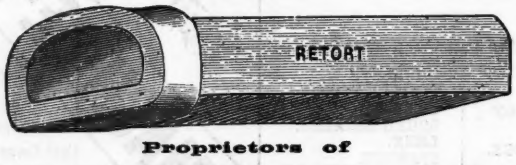

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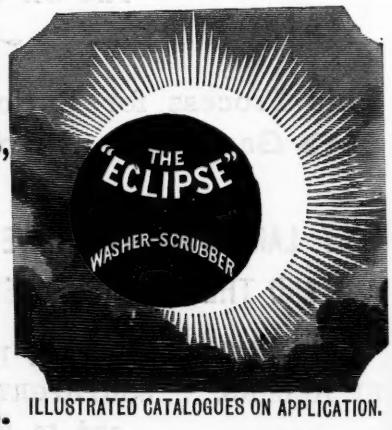

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Keighley Corporation . .	2 ,,	1,000,000 ,,	Do. do. . . .		1,500,000

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